POLAR SCIENCE, TECHNOLOGY AND INFORMATION

TENTH ANNIVERSARY CONFERENCE OF ACUNS, RYERSON POLYTECHNICAL INSTITUTE MAY 1-2, 1987

LA SCIENCE, LA TECHNOLOGIE ET L'INFORMATION POLAIRES

DIXIÈME CONFÉRENCE ANNIVERSAIRE DE L'AUCEN, INSTITUT POLYTECHNIQUE RYERSON 1-2 MAI 1987

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AND
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JANUARY, 1988.

ASSOCIATION OF CANADIAN
UNIVERSITIES FOR NORTHERN STUDIES
ASSOCIATION UNIVERSITAIRE
CANADIENNE D'ÉTUDES NORDIQUES

88-05721/

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130 Albert Street, Suite 1915,
Ottawa, Ontario, Canada K1P 5G4
(613) 238-3525

Deposited at the National Library of Canada
Ottawa
1988

ISBN 0-921421-03-6

PREFACE

The Tenth Anniversary meetings of the Association of Canadian Universities for Northern Studies/Association universitaire canadienne d'études nordiques (ACUNS/AUCEN) were held at Ryerson Polytechnical Institute, Toronto, 30 April to 2 May 1987. The Association is required to call its member universities together each year to conduct Association business. Over the years, a virtue has been made out of this important necessity by building an 'academic' conference around the annual business meeting, and the diversity and quality of activities at the Ryerson meetings provides an excellent example of the fruits of this policy.

This volume is divided into five Sections, each of which represents an important focus of activity during the conference. The proceedings commence with a summary of ACUNS activities over the past ten years, focussing on an address by Dr. Trevor Lloyd, Professor Emeritus of McGill University, founder and first Executive Director of ACUNS/AUCEN.

Technology and the North was a theme developed by Professor Frank Duerden of Ryerson. This is a topic which reflects his own interests and those of his university which is Canada's only polytechnical institute. The meeting was designed to bring together people informed about technology in the North and the impacts of technology in the North.

The session on Polar Science was stimulated by the commissioning and release, by the Minister of Indian Affairs and Northern Development, of a report 'Canada and Polar Science/Le Canada et la science polaire'. The inquiry upon which the report was based focussed originally on whether or not Canada needs a national polar institute. This inquiry generated a great deal of interest at the Association's 1986 meetings in Yellowknife, N.W.T. At Ryerson, the session was built around an address by Dr. A.L. Washburn, Professor Emeritus at the University of Washington. He outlined federal activity in arctic science in the United States. This was followed by a discussion and question and answer session involving the authors of Canada and Polar Science (F. Roots, P. Adams, P. Burnet; W. Kemp standing in for M. Gordon), Dr. Washburn and Dr. R. Janes, Executive Director of the Science Institute of the Northwest Territories. In this volume, the Polar Science Section includes Washburn's address, speeches by the Hon. Bill McKnight, Minister of Indian Affairs and Northern Development, and T.H.B. Symons of Trent University (speeches delivered on the release of the report), followed by a summary, in both official languages, of Canada and Polar Science.

The Information and the North section includes a number of the papers delivered at the Northern and Offshore Information Resources Seminar which was held in conjunction with the ACUNS/AUCEN conference. These are papers on Northern information systems which were not included with the thirty or so which were published in the proceedings of ACUNS'/AUCEN's 1986 annual meetings (Education, Research, Information Systems and the North, ACUNS, Ottawa 1987). The Association is pleased to be able to cooperate with NOIR again and to be able to publish this important material.

The last section of this volume summarizes Association business that was dealt with in the course of the conference and also contains proceedings of meetings of associated groups that were held concurrently with the ACUNS meeting - the Arctic Heritage group, the Subarctic Universities, and the Northern Scientific Training Grants Program.

The Editors are most grateful to all those who submitted manuscripts for this volume, and on behalf of ACUNS/AUCEN we wish to thank all those who contributed to the Tenth Anniversary meetings. We would mention in particular Dr. B. Segal, President, Ryerson Polytechnical Institute, Professor T. Grier, Vice-President, Professor Ann Schrecker, Chairman of Architecture, and various faculty of the School of Applied Geography. Outside Ryerson, special thanks are due to the Ministry of Northern Development and Mines, Ontario and Mr. Herb Aiken for their interest, sponsorship and support. We are also grateful to the Promotion of Official Languages Branch, Secretary of State, Ottawa for support for simultaneous interpretation provided during the meetings.

We are highly indebted to Ms. Eileen van Heyst, Administrative Officer of ACUNS/AUCEN for her work on the conference and on this volume.

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PRÉFACE

Pour son dixième anniversaire, l'Association universitaire canadienne d'études nordiques/Association of Canadian Universities for Northern Studies (AUCEN/ACUNS) a tenu son Assemblée annuelle, du 30 avril au 2 mai 1987, au Ryerson Polytechnical Institute de Toronto. L'AUCEN est, en effet, tenue de réunir une fois l'an les universités membres pour mener à bien les affaires de l'Association. Au cours des années, on a fait de cette (importante) nécessité vertu en adjoignant une Conférence universitaire à la Rencontre annuelle pour affaires: la qualité et la diversité des activités qui se sont déroulées à l'Institut Ryerson mettent bien en évidence les avantages d'une telle ligne de conduite.

Le présent ouvrage est divisé en cinq sections, chacune portant sur un important pôle d'activité de la Conférence. Il fait tout d'abord le tour d'horizon des activités de l'AUCEN au cours de ses dix années d'existence, et met en relief une allocution de M. Trevor Lloyd, Professeur émérite de l'Université McGill, fondateur et premier Directeur général de l'AUCEN.

Le thème de "La technologie et le Nord" a été développé par le Professeur Frank Duerden, de l'Institut Ryerson. C'est là un sujet cadrant bien avec ses propres domaines d'intérêt et ceux de son établissement d'enseigne-

ment supérieur, seul Institut polytechnique du Canada. La Conférence avait été organisée de façon à mettre en contact des personnes bien informées au sujet de la technologie nordique et des incidences de son utilisation dans le Nord.

La séance portant sur "Les sciences polaires" a été animée par la publication du Rapport "Le Canada et la science polaire/Canada and Polar Science" que le Ministre des Affaires indiennes et du Nord avait commandé. Ce Rapport est fondé sur les conclusions d'une enquête publique dont le mandat originel était de déterminer si le Canada avait, réellement ou non, besoin d'un Institut polaire national. L'enquête avait suscité beaucoup d'intérêt lors de l'Assemblée annuelle de l'Association pour 1986, à Yellowknife, T.N.-O. Durant la Rencontre à l'Institut Ryerson, la séance pertinente s'est déroulée à partir de la causerie de M. A.L. Washburn, Professeur émérite de l'Université de Washington. Il avait tracé les grandes lignes des activités de l'Administration des É.-U.A. en matière de sciences arctiques. Cette causerie fut suivie par un débat et une période de questions et réponses, à laquelle participaient les auteurs du Rapport "Le Canada et la Science polaire" (MM. F. Roots, P. Adams, P. Burnet, et W. Kemp, représentant M. Gordon) et MM. A.L. Washburn et R. Janes, Directeur général de l'Institut des Sciences des Territoires du Nord-Ouest. Dans la section "Le Canada et les sciences polaires" figurent la causerie de M. Washburn et les allocutions de l'Honorable Bill McKnight, Ministre des Affaires indiennes et du Nord, et de M. T.H.B. Symons, de l'Université Trent (ces allocutions ont été prononcées lors de la présentation publique du Rapport). Le lecteur trouvera ensuite un résumé, dans les deux langues officielles, de "Le Canada et la Science polaire".

La section sur L'information et le Nord contient un certain nombre de communications présentées lors du Séminaire sur les ressources documentaires sur le Nord et les régions marines, qui s'est déroulé parallèlement à la Conférence de l'AUCEN. Il s'agit d'exposés sur les réseaux documentaires nordiques, qui n'avaient pas été inclus dans la trentaine de textes publiés dans le Compte rendu de l'Assemblée annuelle de l'AUCEN pour 1986 (Education, Research, Information Systems and the North, ACUNS, Ottawa, 1987). L'Association est heureuse de collaborer de nouveau avec le Groupe des ressources documentaires sur le Nord et les régions marines (NOIR), et de publier ces exposés importants.

La dernière section du présent ouvrage résume les affaires de l'AUCEN qui ont été examinées au cours de la Rencontre, et contient également les comptes rendus des réunions des groupes associés qui se sont déroulées parallèlement à la Conférence de l'AUCEN: Groupe du patrimoine arctique, Universités médionordiques et Programme de formation scientifique dans le Nord.

Les directeurs de publication remercient de tout coeur les auteurs qui ont communiqué leur manuscrit pour la préparation du présent Compte rendu, et ils se font les interprètes de l'AUCEN pour remercier les personnes qui ont apporté leur contribution à la Rencontre de Dixième anniversaire, et en particulier MM. B. Segal, Président du Ryerson Polytechnical Institute, et T. Grier, Vice-président, la Professeure Ann Schrecker, Président de l'École d'architecture, et divers professeurs de l'École de géographie appliquée. En dehors de l'Institut Ryerson, l'Association remercie particulièrement le Ministère du Développement nordique et des Mines de l'Ontario et M. Herb Aiken, pour le soutien moral et matériel qu'ils lui ont apporté. Nous

remercions également la Direction de la promotion des langues officielles du Secrétariat d'État, pour une aide qui nous a permis de fournir des services d'interprétation simultanée au cours de la Rencontre.

Nous sommes très reconnaissants envers Mme Eileen van Heyst, Agente d'administration de l'AUCEN, pour son inlassable collaboration au cours de la Conférence et de la prépartion du présent Compte rendu.

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Janvier 1988

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ACUNS TENTH ANNIVERSARY
DIXIEME ANNIVERSAIRE DE L'AUCEN

ACUNS

TENTH ANNIVERSARY

Introduction

The Association of Canadian Universities for Northern Studies (ACUNS) was founded in 1977.[1] It is an organization of universities which now has 34 member institutions from coast to coast.[2] Each of these universities has a Northern Studies organization of some sort. These range from a President's, or similar, committee to major bodies whose influence extends beyond the campus concerned, such as the Arctic Institute of North America (University of Calgary), the Boreal Institute (Alberta), le Centre d'Etudes Nordiques (Laval) or the Centre of Northern Studies (McGill). Each of these organizations appoints a representative to the ACUNS Council, which meets once a year on a university campus or in the North. The Council elects a seven-person Board[3] which controls the Association and, through committees, runs its affairs during the year.

The purpose of ACUNS is "The advancement of Northern scholarship through education, professional and scientific training and research".[4] It achieves this broad purpose by acting as a "networking" body, improving communications and forming links among its member universities, and acting as a bridge between its members and Governments and the private sector in Canada and between its members and universities and other agencies abroad.

The principal focusses of Association activity are the National Office (#1915, 130 Albert Street, Ottawa K1P 5G4, 613-238-3525), the newsletter, Northline/Point Nord, the annual general meeting of the Council and Board and other conferences such as the National Student Conference on Northern Studies (1986) and the Arctic Heritage Symposium (1985).

The Association owes a great debt to Professor Trevor Lloyd whose interest in and contributions to ACUNS/AUCEN continue today as they began even before it was officially founded. Professor Lloyd was the founder of ACUNS/AUCEN and its first Executive Director.

We are delighted and honoured to publish the following article, based on Professor Lloyd's address to the Tenth Anniversary meetings.

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1. ACUNS was founded in Churchill, Manitoba on April 19, 1977. Twenty-five universities were present at the inaugural meeting (see Sixth Canadian Universities Northern Science Training Conference, Third Session, Proceedings, ACUNS, 1977).

2. The current members are: University of Alberta, Athabasca University, Brandon University, University of British Columbia, University of Calgary, Carleton University, Concordia University, Dalhousie University, Ecole Polytechnique, University of Guelph, Lakehead University, Laurentian University, Université Laval, University of Manitoba, McGill University, McMaster University, Memorial University, Université de Montréal, University of New Brunswick, University of Ottawa, Université du Québec en Abitibi-Témiscamingue, Université du Québec à Chicoutimi, Université du Québec

à Montréal, Queen's University, University of Regina, Ryerson Polytechnical Institute, University of Saskatchewan, Simon Fraser University, University of Toronto, Trent University, University of Waterloo, University of Western Ontario, University of Windsor, York University.

3. The current Board comprises, Marc-Adélard Tremblay (Laval), President; John K. Stager (U.B.C.), Vice-President; Frank Duerden (Ryerson), Secretary-Treasurer; James B. Carefoot (Regina), Hugh M. French (Ottawa), Marianne Stenbaek (McGill), Geoffrey B. Weller (Lakehead).

4. The purposes and objectives are elaborated in considerable detail in various reports and publications. These include Association of Canadian Universities for Northern Studies, Evaluation Study Report, August 1983; and ACUNS Council Members' Handbook, both on file at ACUNS. See also Tremblay, M.-A. 1987, ACUNS and the North in Adams, Peter (ed.), 1987, Education, Research, Information Systems and the North, ACUNS.

5. Adams, W.P. 1987. ACUNS, an example of a University Networking Organization, Research Co-operation Among Universities and Heritage Agencies: A Workshop (J.G. Nelson, P. Oneil, J.A. Caruthers, eds.), Heritage Resources Centre, University of Waterloo 1987, 109-117. L'AUCEN, un exemple d'organe de concertation interuniversitaire (submitted to Études Inuit Studies).

WHENCE CAME ACUNS?

Trevor Lloyd
Professor Emeritus, McGill University, Montreal, Quebec

Introductory Note

The paper which follows provides in I hope an accurate and unadorned manner, a contribution to a first-hand record of how contemporary Canada re-discovered its North. At many stages in it there should really be pauses to record appreciation and thanks for disinterested services rendered, or information provided, but I have never been an admirer of many footnotes. On the occasion at Ryerson Polytechnical Institute when the paper was presented in public, there was in the audience one to whom Canadians interested in the North, especially those who are scientists, owe an expression of gratitude. I am referring to a non-Canadian who directly and indirectly did much to lay the foundations of today's northern research. I refer to Dr. Albert Lincoln Washburn (and I include also the name of his wife and constant scientific companion, Tahoe Washburn). There exist in the literature long lists of the distinguished Founders of the Arctic Institute of North America. But, Linc Washburn was one of the very few who should never be overlooked. He it was who formed the link between the small group of American arctic scientists and the similar team of Canadians who in 1943 and 1944 put the concept of a northern institute into practical form. Once the "Founding" had been done, he then, at no little personal inconvenience, moved to Montreal to become its first Executive Director.

As a student of all things Quaternary he has devoted a long and active career to innovative field research - bracketing North America by his own field camps in northeast Greenland and northwest Canada. On Victoria Island, N.W.T. are two lakes named Washburn and Tahoe so drawn and labelled on an almost blank map by the admiring bush pilot who dropped the couple off there in 1940, picking them up the following year.

Linc Washburn's subsequent arctic career will serve as an appropriate time-scale for what follows.

To select a starting point for such a chronological address is no simple matter. The true origins of even as relatively young an organization as ACUNS, may be a good deal more remote than at first appears. In setting about the task, I am haunted by a difficulty my former Dartmouth colleague Stefansson encountered year after year. Invited to tell one of my Arctic courses about his own expeditions during the early years of this century, he invariably agreed to do so in six lectures. There was only a single condition. He did insist that some historical background was desirable, and always chose as a starting point Pytheas of Marsalia, the Greek explorer who may have reached Iceland about 2200 years ago. Not once in ten years did Stef get past the Vikings in Greenland, but consoled the students that they could read about the expeditions in his books in the library.

But I must hurry on to reach the founding of ACUNS!

For my starting point I shall take refuge, as scholars are wont to do, in a footnote recommending the researches of someone else, and a historian at that.

Shelagh Grant of Trent University completed a graduate thesis[1] in 1982 which should shortly be published as a book. In it she describes and analyses, after much digging in Canadian government records, supplemented by oral history and fieldwork, an aspect of the recent history of Northern Canada which must have puzzled many of us. During World War II the North stagnated, the circumstances of its native people were deplorable, there was no administration worth talking about, and economic activity was negligible. And things had been no different for decades before, except for a brief flowering of activity in the 1920's. By the early 1950's the whole situation had become transformed. There had been no abrupt change of government; yet politicians and bureaucrats, field scientists academic and governmental, as well as the North's customary fringe of commercial hangers on, were now loudly declaring their dedication to "A New North" and devoting their energies to development on "Canada's Last Frontier".[2]

The customary explanation of the dramatic transformation has been quite simple. The Second World War had ended, and things were getting back to normal. But "normal" in this case would have been "nothing doing", and this was no longer the case. Some might claim that the war itself could have caused the change. Yet Northern Canada was, perhaps surprisingly, little influenced by the war, and by actual fighting not at all. Alaska, Greenland & Arctic Scandinavia were certainly directly involved, but the most startling wartime event in Northern Canada to those who knew of it, was the instant nationalization of the Eldorado Radium and Uranium mine on Great Bear Lake, because the private owners were "bootlegging", if that is the right word, their product to the United States.

Shelagh Grant traces the abrupt reforms of the 1940's to the influence during the war of a comparatively small group of individuals, some in the federal service in Ottawa and others close to it. They were looking ahead to the transition from war to postwar reconstruction, as an opportunity to end once and for all the customary neglect of the North and so, to launching new dynamic policies there. They had despaired of any reforms coming from within the existing northern administration (such as it was) and concluded that the kinds of changes required could only come about through an entirely new administration manned by new people. But they also acknowledged that "politics being the art of the possible", any such "revolution", to be successful would have to be acceptable at the top of the political/administrative pyramid, i.e. through the Privy Council Office and the office of the Prime Minister, and with the support of at least some of his more influential Cabinet colleagues.

Meanwhile, anything that could be done to awaken the better-informed element among the general public, would be all to the good - and this would entail the interested support of media, aided perhaps by some of the wartime

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[1] Grant, Shelagh Dawn. "Sovereignty, Stewardship and Security, in the Evolution of Canadian Northern Policy", Trent University, 1982. The book is likely to be entitled "Sovereignty and Security, Government Policy in the North".

[2] I have often considered trying to copyright these now rather time-worn labels, attached to pamphlets I issued almost 50 years ago.

propaganda agencies. Still additional pressure could be applied through universities or other organizations interested in good government.[3]

No assistance whatever was to be expected from the Department responsible for northern administration, whose Minister and Deputy Minister were notoriously somnambulant. (It was later apparent from his diary that the Prime Minister as early as 1940 had characterized the Minister as ineffective, which did not prevent his subsequent transfer to the Senate where he survived until the age of 95 years).

As often before and since, awakening the people of Canada to the need for action about the North, was made simpler by the large-scale wartime interference there from the United States. The general public (or at least those permitted to learn about it) were seriously upset at the manner in which the United States military forces treated Canada as an extension of their own territory. To the northeast this led to establishment of a number of air bases, some of them uncompleted, as well as a network of weather and communications stations. To the northwest was the abortive "Canol" pipeline,and the Alaska Highway and much else. Canada was treated as a passage-way en route to Alaska and U.S.S.R. in one direction and to Greenland and Northern Europe in the other. And there was the very real fear that all this presaged a claim after the war to use all these public works as a basis for intercontinental commercial and military air routes. A somewhat later example of "The Man Who Came To Dinner" was the attempt in 1946 to establish United States weather stations on the outer perimeter of the Queen Elizabeth Islands. When delayed a year by Canada, the project became "Joint Weather Stations", but even the U.S. occupants of these were difficult to dislodge, for they held on for 25 years.[4]

Part of the difficulty was that the Canadian civil administration in the North was totally inadequate. There were a few trading posts, primarily of the Hudson's Bay Company, scattered Anglican and Roman Catholic missionaries doubling as grade school teachers and social service aides, and a few dozen untrained members of the R.C.M.P. The primary attraction of this arrangement was that it was cheap for the government. This situation was the basis for my written comment at the time that "the Canadian North was governed in a prolonged fit of absence of mind". (The remark was not original since it was used in the 19th Century to describe the origins of the British Empire. When launching the new Department of Northern Affairs in 1953 in the House of Commons, M. St. Laurent gave the phrase further circulation by expropriating it to himself!)

Fifty years ago most of the Inuit in the North and many Indians were still semi nomadic and there were no significant urban centres. Of airfields there were none, no ports, nor surface transportation; and electronic communication was negligible; as was the weather service. No up to date maps existed nor was there even a rudimentary survey system (for example, as late as 1945

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[3] This helps to explain the occurrence of sundry pamphlets and a MacLeans article accompanied by a world aviation map, on lists of my published works.

[4] For a detailed documented discussion of persistent U.S. attempts to establish their military forces in the Canadian North, see Shelagh Grant op. cit.

the most northerly geodetic survey marker in eastern Canada was at Blanc Sablon on the north shore of the St. Lawrence). The United States had selected the sites of its wartime airfields and constructed and operated them independently. The location of some weather and radio stations remained unknown to the Canadian Government until the time arrived to disband them.

In summary, the Canadian North was, in effect, in the state European explorers had left it, while the condition of the native peoples had seriously deteriorated.

Formal Canadian authority to govern the North was at the time vested in two Councils of the Yukon and Northwest Territories. Members of the latter in the early 1940's were all "nominated", and were Ottawa government officials. In fact all but two of them served under the Deputy Minister who was also the Commissioner. The Council met for convenience in his office, and all meetings were held (illegally) in camera.[5] The two partly independent members were an R.C.M.P. nominee who usually remained silent, and a recently appointed member, Dr. H.L. Keenleyside representing External Affairs. He soon expressed concern about the obvious backwardness of the Territory and its vestigial administration. Hoping to get things moving he tactfully suggested that use could possibly be made of reports coming regularly from Greenland. He was told that as Greenland was a colonial territory, the applicability of any of the information to Canadian conditions would be remote. As an alternative he suggested preparation of a report on administration of northern U.S.S.R. This idea was not well received.

Nevertheless, in the Spring of 1943 External Affairs arranged for the Soviet report to be prepared privately, and a few months later it was circulated among senior Cabinet Ministers and others. The Prime Minister made favourable comments on it. The author had suggested that in view of the dearth in Canada of information on northern U.S.S.R. that the Soviet Union, a wartime ally, be asked to provide more. This was agreed to and a voluminous questionnaire was compiled with the assistance of a dozen government departments. It was passed on to the Soviet Embassy but no reply was ever received. Fourteen years later when on a visit to the Soviet Arctic Institute in Leningrad, I was told that the questions had been received and replied to in detail, but the Institute was disappointed when no acknowledgement had arrived from Canada. Presumably the replies were blocked at a higher level in the U.S.S.R..

So far as is known this 1943 effort was the first attempt to initiate an Arctic information exchange between Canada and U.S.S.R. There have been many since, but only recently have they begun to be productive.[6]

As an addendum to the 1943 Report on the U.S.S.R. Arctic, the author pointed out that Ottawa's shortage of information on the North extended also to Canada. He recommended that a central clearing house or Northern

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[5] The "Northwest Territories Council" was by statute the Legislative Assembly of the N.W.T. and should have been acting as such.

[6] Amusingly, the documentation for the ACUNS Tenth Anniversary Conference was distributed to delegates in a folder inscribed "Canada-USSR Programme of Scientific and Technical Cooperation"!

Information Office be set up, and prepared an outline on how this could be done. The concept was generally well received by the government but not so by the Northern administration in Ottawa. So as an alternative, the government suggested formation of such an organization as a private enterprise, available for use also by government (what would now be considered a QUANGO[7]). This, with modifications became the original Canadian proposal for an Arctic Institute. The Arctic Institute of North America - with four member countries - Newfoundland, Greenland, the United States and Canada was founded in 1944 and incorporated by special Act of Parliament in 1945.

Once the government decided to reform the administration of Northern Canada, lack of current information about the enormous region was recognized as a serious handicap to formulation of new policies. Some data might well exist in the Northern administration's own Bureau in Ottawa, other material in Hudson's Bay Company files and in the records of Church missionary agencies and the R.C.M.P. files. But the material would neither be in usable form nor accessible. It seemed most unlikely that even basic environmental information existed - meteorological data, topographic maps, nautical charts and so on. The North really was very much an unknown land!

The Canadian Institute of International Affairs, a non-official research organization with branches across Canada, had shown interest in the postwar future of the World's Arctic regions as a whole, especially in view of the probable forthcoming use of trans-polar air routes. It agreed to sponsor through its research committee, an unofficial study of Northern Canada, and to obtain the necessary modest funding to see it through. I as a member of CIIA, agreed to compile a comprehensive survey of the geography of Northern Canada from available data, to describe existing administrative arrangements and to offer suggestions for reforms. The Government at the highest level assured CIIA of its full cooperation with the undertaking. (In fact this did not materialize. The Director of the N.W.T. Bureau in Ottawa (who was also Deputy Commissioner, N.W.T.) instructed Department staff to withhold information from the study and have no contact with the author. In addition, the Bureau began preparation of its own "official" series of Reports on aspects of the geography of the North, publishing them over a period of years.[8] The series did not include any discussion of administration.) The author of the CIIA study spent some time in Greenland, so was able to introduce into his Report useful suggestions based on Danish experience. Begun in early 1943, the Report was available in draft form in 1946 when it was circulated within the Government. The final 1947 version was read quite widely. Some parts of the Report had considerable immediate influence, e.g. among the first acts of the newly constituted (1946) Department of National Health and Welfare under the Minister, Brooke Claxton, was transfer to Health and Welfare of responsibility for the Northern Indians and Eskimos.

The CIIA Report never appeared in print for general circulation, although the Research Committee recommended that it should do so. Microfilm

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[7] Quasi N.G.O.

[8] The Bureau had no scientific staff, nor the budget to employ any. However it did command a new and dependable source of funds out of reach of the Receiver-General - profits on the liquor sold at the Yellowknife Inn bar!

copies have been quite widely dispersed to libraries and increasing use is being made of the Report as a "baseline" of northern conditions as they were in the mid 1940's. Shelagh Grant used it exhaustively for her own study.

The most dramatic change in northern administration came in 1947 with appointment of Dr. H.L. Keenleyside as Deputy Minister of Mines and Resources and Commissioner of the Northwest Territories. Reforms followed soon after. The same year the author of the CIIA Report became Chief of the government's new Geographical Bureau, with special responsibility for accelerating research in Northern Canada.

This prelude to the 1977 founding of ACUNS began, as we have seen, with one of those periodical upsurges in Canadian interest in the North (not unrelated to a fear of losing it). That particular cycle culminated in establishing of Canada's first department of northern affairs in 1953. Let us now examine how these events affected the universities.

In the early 1940's there were no Canadian government or private foundations or "Granting Councils" available to finance northern research or the training of a new generation of graduate students to engage in it. In those days, even the rare northern scholars to be found in federal employment could not count on financing for their own fieldwork. Some of them, like Diamond Jenness, one of the world's most famous ethnographers, passed many summers at the old National Museum in Ottawa.

Fortunately, United States foundations, particularly the Carnegie Corporation of New York and the Rockefeller Foundation, maintained contacts with learned goings-on in Canada and after some skillful prompting, concluded that the time had come along Canada's northern frontier for some sort of development. The Rockefeller Foundation took the initiative early in 1947, offering to provide financial aid to the new Geography Summer School organized by McGill at Stanstead, Quebec. Grants would be provided for training northern specialists; parallel funding would assist the new Arctic Institute's growing library in Montreal. A grant was also provided for a systematic review of the organization of Arctic studies in Western Europe. Follow-up support provided for observation of the reforms being initiated in Greenland which led to dramatic changes in the old colonial government there. The hope was that Canadian links with Greenland would be mutually beneficial.

The Carnegie Corporation focused its support on a long-term graduate training program in arctic field subjects. The grants which were open to applicants world-wide, combined financing for academic study during the winter, and for a succeeding summer field program. This scheme continued for ten years and proved a major source of new university staff and of government scientists. The Carnegie Programme was based at McGill, because it already offered advanced degrees in the appropriate disciplines and was also the site of the Arctic Institute's headquarters.

The Arctic Institute itself deserves additional comment if only because its founding in 1944 made a major contribution to the growth of systematic arctic research in Canada and the United States. Indirectly, it also had an impact in Denmark and Greenland. The Institute's own arctic expeditions and its funding of individual and group field programs, were particularly productive at a time when government-sponsored scientific work in the North was

rare. AINA launched the new scientific journal Arctic in 1947 and eventually issued a whole series of book-length technical reports. It eventually assembled what was once the best polar library in North America and accumulated significant research and information files. Not least, it provided international contacts, particularly for Canadian northern scientists. It is not generally realized that the Institute initiated Canadian contacts with the Soviet Arctic Institute as long ago as 1957, and established an inter-library exchange arrangement with the Lenin and other Soviet libraries shortly afterwards. It eventually maintained world-wide exchanges with other lands having polar interests, especially by way of their universities.

An outstanding Canadian example of the effective use of government money for northern research was thought by many to be something of an oddity: This was the Defence Research Board which emerged from the Second World War as a large, complex example of "Operational Research". It was an integral element of National defence, created in the face of considerable opposition from traditionalists which persisted, and eventually led to its liquidation. DRB's facilities in the early years. The Arctic Institute had established bases in both Yukon and on Devon Island, the University of Saskatchewan sponsored a well-equipped centre at Rankin Inlet, and Queen's University built up a highly regarded station near Churchill. McGill's contribution was a summer base on Axel Heiberg Island and the year-round station at Schefferville. Some universities depended upon access to these or other stations, including those gradually being provided by Government. The extent to which both the needs and the means of meeting them have grown is revealed by a recent ACUNS publication.[9]

While in the early years Arctic research by university students had been the preserve of post-graduates - who had often come to Canada after receiving a first degree elsewhere - it was eventually recognized that undergraduate programs were also desirable. This now well-established principle ensures that young Canadian students can qualify for northern fieldwork assignments and accumulate several seasons of northern experience.

Today many universities offer undergraduate programs of Arctic, northern or native studies as part of their ongoing offerings. In addition to training southern students, such arrangements also provide a receptive environment for native and other students from the North. Serious deficiencies in the effectiveness of the northern high school system, until recently denied all but a few native students access to standard university degree programs. At long last this barrier is being removed so that northern residents, many of whom are already already equipped with local languages and a practical knowledge of the northern environment, can now combine with these the advantages of formal academic training. This should eventually produce a generation of well-rounded northern researchers combining the skills of north and south - something not yet fully achieved even in Greenland, northern Scandinavia or the U.S.S.R. and only to a limited extent in Alaska. The time is now arriving for systematic international exchanges of northern students.

The Department of Northern Affairs in Ottawa became, about 20 years ago, more aware that university northern studies courses were increasing in number and diversity. Interest in them arose, at least nominally, because of the

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[9] Canada's Northern Stations, ACUNS Occasional Publication No. 13, 1986

need to ensure a sufficient flow of competent personnel to meet the government's growing northern administrative responsibilities. In some manner whose origins are now lost in the mists of time, the Department agreed to make available modest grants to assist selected students in doing northern fieldwork. (One supposition has been that the Minister, Alvin Hamilton, tried to repair the damage done by his Prime Minister when he banned the use by scientists and field assistants of spare seats on RCAF northern planes. The ban had been designed to compel them to use commercial flights.) Whatever the cause, the government has since subsidized northern student research training at those institutions with a formal supervisory committee structure. The arrangement encouraged universities to create such structures, and so can be fairly considered as a significant influence in the eventual emergence of ACUNS. It was at a meeting of representatives of university committees in 1974, that formation of a Canada-wide body first arose. The first of the national gatherings had been held in 1967 at Saskatoon. The tradition of issuing formal reports was soon established as was the presence of interested government representatives. Most of the early meetings were held in the North; that of 1974 (the Fifth) already referred to was at Schefferville. There almost casually, the suggestion of a cooperative national body to represent all Canadian universities active in Northern research, surfaced. The formal Report edited by Professor J.B. Bird lists 23 persons in attendance, all but 6 from universities. On page 39 is a statement entitled "Retrospect - Developments in Universities". The opening paragraph thanks Northern Affairs for past blessings. Following two pages of background on the growth of northern research in Canada, especially in universities during the previous 20 years, there is the hint of a suggestion about future coordination of fieldwork, co-operative provision of field stations, and a joint approach to government for support. The meeting then adopted four resolutions, one of which called for a meeting in a year's time at Rankin Inlet, under the auspices of the University of Saskatchewan.

Those resolutions at Schefferville, in fact spawned in all four substantial Conference Reports, the last of them bearing the ACUNS name and address as publisher.

The Sixth Canadian Universities Northern Science Training Conference met at Saskatoon and Rankin Inlet. The Report includes a detailed record of discussions about "An Association of Northern Canadian Centres, Institutes and Committees" led by Keith Greenaway, Science Advisor, Department of Indian and Northern Affairs. This set the constructive tone of the whole Conference which ended with naming of a "Working Group" to recommend a form of Canada-wide association to which university northern research centres, institutes and committees could adhere.

The Working Group's instructions were comprehensive; it was asked to complete a Report by July 1, 1976, - i.e. in less than six months.

The Sixth Conference adjourned to meet at Edmonton, as it did later on to Churchill, sparing the Department of Indian and Northern Affairs - which footed the bill - the possibility of criticism for supporting too many annual conferences in one year!

The Working Group's Report - termed a "Discussion Document" - was considered at the Edmonton meeting in December 1976. Discussion of the Report,

and it was a thorough and workmanlike process, is fully covered in the Report issued by the Boreal Institute, University of Alberta, the Host at the Second Session of the Sixth Conference. Universities represented numbered 23 with two others unable to be present for a total of 25. The Conference concluded with a Resolution moved by Professor Valentine, seconded by Professor Wein reading as follows.

> Be it resolved that the Conference of university representatives agrees to the formation of an Association of Canadian universities active in northern research and training as recommended in the report of the Working Group.

The Resolution was carried without dissent. If I may say so, the whole process of founding ACUNS does seem at this distance a remarkable performance verging on the miraculous --- for 25 universities to have agreed unanimously about anything let alone founding a highly complex organization. Of course, all who were involved had shared objectives. But I suspect we were also fortunate in the choice of Chairman, for Dr. Bob Bone of Saskatoon saw the itinerant Sixth Conference right through to its end at Churchill, Manitoba.

The Third Session of the VIth Canadian Universities Northern Science Training Conference met at Churchill April 17th-20th 1977. It was attended by representatives of 25 university members. The Working Group created at Rankin Inlet produced its final Report and was dissolved, since the Association was now in being and its first officers elected. The Conference Report of Proceedings also contains the draft Constitution and By-laws.

Conference members were an appreciative audience at the formal opening of the Churchill Research Centre Inc. - founded by local residents assisted by the Government of Manitoba.

It should be added that my task in tracing the founding of ACUNS has been a pleasant one, largely because of the admirable records maintained and prepared for publication by Eileen van Heyst.

Documents Cited

Proceedings, Fifth Canadian Universities Northern Science (Training) Conference, April 1974, J. Brian Bird (ed), McGill Subarctic Research Paper No. 27, January 1975

Proceedings, Sixth Canadian Universities Northern Science Training Conference, Saskatoon, Sask./Rankin Inlet, N.W.T., February 26-29, 1976, Sandra E. Dibb (ed), Institute for Northern Studies, University of Saskatchewan, Saskatoon

Report of the Working Group on an Association of Canadian Universities Active in Northern Research, Discussion document for Sixth Conference, Session II, Edmonton, Alberta, Dec. 9-11, 1976, November 24, 1976.

Proceedings, Sixth Canadian Universities Northern Science Training Conference, Second Session, Edmonton, Alberta, December 9-11, 1976, Boreal Institute for Northern Studies, University of Alberta, Edmonton, Alberta, 1977.

Proceedings, Sixth Canadian Universities Northern Science Training Conference, Third Session, Churchill, Manitoba, April 17-20, 1977, Association of Canadian Universities for Northern Studies, Ottawa, Ontario, 1977.

Use was also made of the leaflet: Association of Canadian Universities for Northern Studies - Association universitaire canadienne d'études nordiques.

Addenda

It is not for me to assess the progress of ACUNS during its initial decade. A listing[10] of the main events along the way has now been published. It is an impressive document, especially when one takes into account the chronic shortage of operating funds which has existed. All who participated in the work have, I feel sure, good cause to look back over the years to April 1977 with satisfaction, if only because of a recent newspaper headline "Clark Urges More Action on Arctic".[11] So far as I can recall it is the first time a Minister of External Affairs or any other senior Cabinet member has spoken so firmly about the Canadian North, since Lester Pearson did so in a 1946 "Foreign Affairs" article when he served notice to the U.S. Navy to take its task forces somewhere else (they eventually moved to the Antarctic).

I raise Mr. Joe Clark's most welcome intervention because we are still as a country in serious trouble over the formulation of national policies relating to the North. There is today and has long been, an absence of national leadership concerning it. We have no organized body, private or government, qualified to take the initiative. What is less apparent is who Mr. Clark, in his Vancouver address, is calling on for action. Surely not his audience, the Vancouver Board of Trade! A year or so ago, he spoke to CIIA branches in pretty much the same terms. As we know, that organization took the initiative 40 years ago and then published a book, 'The Arctic Frontier', 20 years later summarizing the situation. More recently, the Royal Society published A Century of Canada's Arctic Islands, a well informed contribution to public education on the North. What all this suggests is that the time is opportune for a concerted campaign to formulate, outside government, national policies on the North - not about "land claims" and allocation of boundaries, etc. - but about long term development in the broadest sense, of Canada's Subarctic and Arctic, which despite past efforts, still remain outside what the Greeks called "The Oecumene", the occupied part of a nation. The task will need to be carried out within the overall framework of the present-day circumpolar world. Lester Pearson insisted on this twenty years ago in Foreign Affairs. Scientific collaboration can continue with the United States, but certainly not exclusively and only if the old problems of military/economic aggrandisement can be solved once and for all.

This is where ACUNS and associated bodies can, I believe, take some initiative.

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[10] Chronology of Selected ACUNS/AUCEN Activities 1977-1987.
[11] Ottawa Citizen, April 23, 1987, p. A5

The proposals in the recent Report of the Minister's Working Group on a Polar Institute[12] seem to be constructive and timely, especially the recommendation that a building be provided as a focus for the many and varied northern movements now in existence. But it is not necessary to wait upon the convenience of the Department of Public Works. A movement can be initiated at once to prepare, over a period of say, two years, a 'blueprint' for a Canadian national northern policy for the 90's and beyond. This will need to command the participation of the dozen or so most competent northern specialists in the country. They in turn could invite the assistance of others for specific tasks. I am not conjuring this idea up from "the vasty deep" like Llewellyn of old. In 1949, Hans Hedtoft, the then Prime Minister of Denmark, set up such a Commission on the future of Greenland. It reported in one year, providing a detailed development review and plan which eventually transformed the old colony, its political status, economy, social and educational services, scientific R & D and all the rest. The same device 25 years later, produced the 'blueprint' for "Greenland Home Rule".

The intervention of Mr. Clark in Arctic discussions together with the Report to Mr. McKnight may release the high level decisions needed to achieve the action I have suggested. Both emphasize the international element in northern policy, a definite advance on earlier policy statements.[13] They also leave room for Canadian participation in other polar activities both North and South.

I have led this audience over a rather long and at times devious trail from 1940 to the present.

Let me express the hope that the significant and successful place ACUNS now holds in Canadian university life will in time compensate for the modest part Northern science is allowed to play in Canadian affairs.

I add my own best wishes to those who are about to lead ACUNS through its second decade and into the next century.

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12 Canada and Polar Science. Report to the Minister of Indian Affairs and Northern Development by W.P. Adams, P.F. Burnet, M.R. Gordon, E.F. Roots, 1987, 116 pp.

13 But see Trevor Lloyd, The Geography and Administration of Northern Canada, CIIA Report 1947, Chapter 1, "Northern Canada in the World Today" and also his "Some international aspects of Northern Canada" in International Journal, Vol. XXV, 1970, pp. 717-725.

CHRONOLOGY OF SELECTED ACUNS/AUCEN ACTIVITIES 1977-87

This list is based on information in the Association's Annual Reports. It is built around the annual meetings with a short commentary on each meeting, a list of Board members, notes on the principal activities of the year and a list of publications.

April 1977 - Third Session of the Sixth Canadian Universities Northern Science Training Conference, Churchill, Manitoba

This was the last of a series of meetings, beginning in 1967, of university representatives. It was the founding meeting of ACUNS/AUCEN, most of the business concerned the drafting of by-laws, etc. Twenty-five universities participated.

Elected to serve on the Board of Directors were:

John K. Stager, University of British Columbia, President
Robert Bergeron, Université du Québec à Chicoutimi, Vice-President
Victor F. Valentine, Carleton University, Secretary-Treasurer
Robert M. Bone, University of Saskatchewan
William N. Irving, University of Toronto
Branko Ladanyi, Ecole Polytechnique

Canadian Universities Northern Science Training Conferences 1967-72

Saskatoon, October 1967; Whitehorse, Yukon, August 1968; Poste de la Baleine, Québec, May 1970; Inuvik, N.W.T., October 1972.

Publications 1974 - 1977

Proceedings, Fifth Canadian Universities Northern Science Training Conference, April 1974, J. Brian Bird (ed), McGill Subarctic Research Paper No. 27, January 1975

Proceedings, Sixth Canadian Universities Northern Science Training Conference, Saskatoon/Rankin Inlet, N.W.T., February 26-29, 1976, Sandra E. Dibb (ed), Institute for Northern Studies, University of Saskatchewan

Report of the Working Group on an Association of Canadian Universities Active in Northern Research, Discussion Document for the Sixth Canadian Universities Northern Science Training Conference, Second Session, December 9-11, 1976, Edmonton, Alberta, November 24, 1976.

Proceedings, Sixth Canadian Universities Northern Science Training Conference, Second Session, December 9-11, 1976, Boreal Institute for Northern Studies, University of Alberta, Edmonton, Alberta, 1977.

Proceedings, Sixth Canadian Universities Northern Science Training Conference, Third Session, Churchill, Manitoba, April 17-20, 1977, ACUNS 1977.

April 1978 - First Annual Meeting of ACUNS/AUCEN, Université du Québec à Chicoutimi

Twenty-seven universities were involved at this stage. The official incorporation of the Association was an important part of the agenda but the tradition of providing an overview of work at the host university was begun. Committee reports were filed on Education, Field Stations, Research, Relations with Northern Peoples and International Relations. A speech from the Minister of Indian & Northern Affairs, Hon. J. Hugh Faulkner, was read at the annual banquet.

Dr. Lloyd appointed Executive Director, June 1977; the Administrative Officer, Eileen van Heyst, was appointed in September 1977.

Publications

List of Northern Specialists at Canadian University, First Edition, Occasional Publication No. 1, 1978.

Study of Northern Scientific Training Grants Program, Occasional Publication No. 2, October 1978.

Proceedings, First Annual Conference, Chicoutimi, Québec, April 19-22, 1978, ACUNS 1978.

April 1979 - Second Annual Meeting of ACUNS/AUCEN, Memorial University, St. John's, Newfoundland

An important topic at these meetings was 'A Framework for Science and Research in the Yukon and the NWT' developed for the Department of Indian and Northern Affairs. New committees reporting this year were Arctic Wilderness Areas and Atlas of Northern Canada.

The principal speaker was the Hon. P. Joseph Goudie, Minister of Rural, Agricultural and Northern Development, Province of Newfoundland-Labrador.

Elected to the Board of Directors for two year terms were:

John K. Stager, University of British Columbia, President
J. Gordon Nelson, University of Waterloo, Vice-President
Branko Ladanyi, Ecole Polytechnique, Secretary-Treasurer
Robert M. Bone, University of Saskatchewan
William N. Irving, University of Toronto
Victor F. Valentine, Carleton University
H. Anthony Williamson, Memorial University

Executive Director: Trevor Lloyd; Administrative Officer, Eileen van Heyst.

Publications

List of Northern Courses at Canadian Universities, Occasional Publication No. 3, 1979.

Report, Second Annual Conference, St. John's, Newfoundland, April 25-28, 1979, ACUNS 1979.

April 1980 - Third Annual Meeting of ACUNS/AUCEN, Trent University, Peterborough, Ontario

At these meetings there was a report from a committee on a Bibliography of Northern Canada. There was also a focus on university Native Studies programs. It had become a practice to devote one session to the Northern Scientific Training Program. The Research Committee presented a detailed set of Northern Research goals for the Association. The principal speakers were Professor T.H.B. Symons and Mr. Bernard Loiselle, M.P., Parliamentary Secretary to the Minister of Indian and Northern Affairs. There was also a session with the Hon. C.M. Drury on Constitutional Development in the N.W.T.

This meeting saw the retirement of Trevor Lloyd as Executive Director. Eileen van Heyst continued as Administrative Officer.

Publications

Preliminary List of Northern Field Facilities, Occasional Publication No. 4, 1980.

The Use of Greenlandic and Danish in Greenland Schools (1950-1978), Occasional Publication No. 5, 1980.

Some Thoughts on the Current State of Teaching and Research about Northern Canada, T.H.B. Symons, Occasional Publication No. 6, 1980.

Report, Third Annual Conference, Peterborough, Ontario, April 23-26, 1980, ACUNS 1980.

April 1981 - Fourth Annual Meeting of ACUNS/AUCEN, Arctic Institute of North America, University of Calgary

Thirty two universities were represented at this meeting. They considered, among other things, an organizational review which had been conducted of the Association. In addition to presentations on northern work at Calgary, the conference addressed the theme "The Role of Canadian Universities in the North". From this year onwards it became the practice to have a conference theme with papers appearing in the Annual Report or elsewhere. The meeting gave approval to the ACUNS Ethical Principles for the Conduct of Research in the North. The principal speaker was the Hon. J. Hugh Faulkner.

Elected to the Board of Directors for two terms were:

J. Gordon Nelson, University of Waterloo, President
Branko Ladanyi, Ecole Polytechnique, Vice-President
Fred Cooke, Queen's University, Secretary-Treasurer
Jack M. Cram, McGill University
Roderick R. Riewe, University of Manitoba
Ross W. Wein, University of New Brunswick
H. Anthony Williamson, Memorial University

Executive Director: P. Campbell Mackie; Administrative Officer: Eileen van Heyst

Immediately following the annual meetings, the Association sponsored a symposium at Banff on Renewable Resources and the Economy of the North.

Publications

Proceedings of the First International Symposium on Renewable Resources and the Economy of the North, M.M.R. Freeman (ed), 1981.

Report, Fourth Annual Conference, Calgary, Alberta, April 29 - May 2, 1981, ACUNS 1981.

May 1982 - Fifth Annual Meeting of ACUNS/AUCEN, Ecole Polytechnique, Montréal, Québec

This meeting saw the establishment of the Canadian Northern Studies Trust, the Association's scholarship arm. As part of that process, the Association had held a workshop on northern manpower in Regina. There was a report on a Bibliographic Data Base for Northern Canada and a Council Members' Resource Book had been produced. The Conference theme was 'Northern Research in the Provinces - Québec, Manitoba and Saskatchewan.

Executive Director: P. Campbell Mackie; Administrative Officer: Eileen van Heyst.

Publications

Ethical Principles for the Conduct of Research in the North, Occasional Publication No. 7, 1982.

Report, Fifth Annual Conference, Montréal, Québec, May 4-7, 1982, ACUNS 1982.

April 1983 - Sixth Annual Meeting of ACUNS/AUCEN, University of Regina, Regina, Saskatchewan

The conference theme was 'Communicating Northern Values' which became the basis for a special publication. A major effort during the year was the Boreal Forest Symposium, held in August 1982 at Lakehead University in Thunder Bay. The Association had also devoted considerable resources to the production of a Native Languages Bibliography, and began work on the Second Edition of the List of Northern Specialists.

Elected to the Board of Directors for two year terms were:

J. Gordon Nelson, University of Waterloo, President
Louis-Edmond Hamelin, Université du Québec à Trois-Rivières, Vice-President
Richard J. Diubaldo, Concordia University, Secretary-Treasurer

Garry K.C. Clarke, University of British Columbia
N. Ole Nielsen, University of Saskatchewan
Roderick R. Riewe, University of Manitoba
H. Anthony Williamson, Memorial University

Executive Director: David A.W. Judd; Administrative Officer: Eileen van Heyst.

Publications

Resources and Dynamics of the Boreal Zone, Proceedings of a Conference held at Thunder Bay, Ontario, August 23-26, 1982, R.W. Wein, R.R. Riewe and I.R. Methven (eds), 1983.

List of Northern Specialists at Canadian Universities, Second Edition, Occasional Publication No. 8, 1983.

Report, Sixth Annual Conference, Regina, Saskatchewan, April 20-23, 1983, ACUNS 1983.

April 1984 - Seventh Annual Meeting of ACUNS/AUCEN, Ottawa-Hull, Hosted by Carleton University

The themes were Issues in Northern Health, Social Sciences and the North, and Native People and the Criminal Justice System in Canada. Papers on each of these appear in the Annual Report. Four publications appeared in 1984.

Executive Director: David A.W. Judd; Administrative Officer: Eileen van Heyst

Publications

Social Science in the North: Communicating Northern Values, Occasional Publication No. 9, 1984

Federal Government Resources for University Research and Science Training in the North, Occasional Publication No. 10, 1984

Guide to Northern Science Licences and Permits, Occasional Publication No. 11, 1984

Report, Seventh Annual Conference, Ottawa-Hull, April 26-28, 1984, ACUNS 1984.

April 1985 - Eighth Annual Meeting of ACUNS/AUCEN, Boreal Institute for Northern Studies, University of Alberta, Edmonton, Alberta

The conference theme was Northern Engineering: Organization and Policy, the papers appear in the Annual Report. The year had seen remarkable activity in the Canadian Northern Studies Trust which had considerable fund-raising success in a difficult business climate, including the development of a scholarship program for native students

planning graduate work in business studies. The Distance Education Committee had produced a report on Distance Education. Professor Marc-Adélard Tremblay replaced Professor Louis-Edmond Hamelin as Vice-President of ACUNS.

Elected to the Board of Directors for two year terms were:

Marc-Adélard Tremblay, Université Laval, President
Hugh M. French, University of Ottawa, Vice-President
Frank Duerden, Ryerson Polytechnical Institute, Secretary-Treasurer
Garry K.C. Clarke, University of British Columbia
J. Gordon Nelson, University of Waterloo
Peter Schledermann, University of Calgary
Marianne Stenbaek, McGill University

Executive Director: W. Peter Adams; Administrative Officer: Eileen van Heyst.

Publications

Distance Education in the Canadian North: An Annotated Bibliography, Occasional Publication No. 12, September 1984.

Northern Engineering: Organization and Policy with Report of the 1985 Conference, Boreal Institute for Northern Studies, University of Alberta, April 25-27, 1985, ACUNS 1985.

April 1986 - Ninth Annual Conference of ACUNS/AUCEN, Yellowknife, N.W.T.

Thirty-five universities were represented plus representatives of a wide variety of 'northern' and 'southern' groups. The meetings were hosted by the Hon. Dennis Patterson, Minister of Education of the GNWT. The Hon. David Crombie, Minister of Indian and Northern Affairs gave the banquet address. The objective of the conference was a "mutual briefing between the universities and northerners". The conference theme was Education and Research in the North, leading to a publication "Education, Research, Information Systems and the North". An important topic at the Council meeting was the national enquiry into the need for a "national polar institute" in Canada. During the year, the Association had organized an Arctic Heritage Symposium, including 12 nations. It published an inventory of Canada's Northern Stations.

Executive Director: W. Peter Adams; Administrative Officer, Eileen van Heyst.

Publications
Canada's Northern Stations, Occasional Publication No. 13, 1986.

1986 Annual Reports, Ninth Annual Meeting, Yellowknife, N.W.T., April 18, 1986, ACUNS 1986.

April 1987 - Tenth Annual Meeting of ACUNS/AUCEN, Ryerson Polytechnical Institute, Toronto, Ontario

The conference themes are Technology and the North and Canada and Polar Science. The latter is designed to allow the Association to respond to the federal report of that name. During the year, the Association organized a Conference of Subarctic Universities and the first National Student Conference on Northern Studies. Dr. Trevor Lloyd, founder of ACUNS, will give a Tenth Anniversary address.

Nominated to the Board of Directors to serve two terms are:

Marc-Adélard Tremblay, Université Laval, President
John K. Stager, University of British Columbia, Vice-President
Frank Duerden, Ryerson Polytechnical Institute, Secretary-Treasurer
James B. Carefoot, University of Regina
Hugh M. French, University of Ottawa
Marianne Stenbaek, McGill University
Geoffrey R. Weller, Lakehead University

Executive Director: W. Peter Adams; Administrative Oficer, Eileen van Heyst

Publications

Arctic Heritage, Proceedings of a Symposium, J.G. Nelson, Roger Needham and Linda Norton (eds), 1987

Education, Research, Information Systems and the North, W. Peter Adams (ed), 1987.

Peter Adams and E. van Heyst

ACUNS MEMBER UNIVERSITIES 1987

University of Alberta
Brandon University
University of British Columbia
University of Calgary
Carleton University
Concordia University
Dalhousie University
Ecole Polytechnique
University of Guelph
Lakehead University
Laurentian University
Université Laval
University of Manitoba
McGill University
McMaster University
Memorial University
Université de Montréal
University of New Brunswick
University of Ottawa

Université du Québec à Chicoutimi
Université du Québec à Montréal
Université du Québec en Abitibi-Témiscamingue
Queen's University
University of Regina
Ryerson Polytechnical Institute
University of Saskatchewan
Simon Fraser University
University of Toronto
Trent University
University of Victoria
University of Waterloo
University of Western Ontario
University of Windsor
York University

TECHNOLOGY AND THE NORTH

LA TECHNOLOGIE ET LE NORD

TECHNOLOGY AND THE NORTH

Introduction

Developing a conference theme on "Technology and the North" was very much an exercise in matching two indefinables. As Bob Page argues in his keynote address, the role and scope of technology is very much a matter of cultural or ideological interpretation; defining "the north" on the other hand opens up yet another phenomenological can of worms, - it may ultimately be a state of mind! Notwithstanding these somewhat abstract and whimsical observations it is evident that technology is pervasive, its impact at every level of societal and economic organization in the north is undeniable, and a theme common to virtually every paper in this collection is the application of technology by or for northerners as opposed to discussions of technology per se. Discussion ranges from high-tech to low tech, from examining the potential use of satellite broadcasting in fostering cultural cohesion and the adoption of computer technology to map out Land Claims through to Inuit clothing technology and the adoption of what our society regards to be standard cartographic skills by Inuit for mapping Land Claims. The preoccupation largely is not with how something works but rather with who applies it, and to what purpose?

The papers are grouped according to theme and there are essentially five of these, clothing technology, communications, community planning, resource evaluation (with special emphasis on Land Claims), and sovereignty.

In his keynote address Bob Page surveys the range and scope of technological applications and impacts in the north drawing attention to technology as a "two edged sword" - capable of generating societal benefits on one hand, but equally capable of permanently damaging northern environments and peoples. It is in this context that he discusses the appropriateness of public policy.

The legitimacy of Page's observations regarding the scope of technology in the north and differing ideological interpretations of technology are superbly illustrated by the contrast between Jill Oakes' paper on Inuit Clothing Technology and Keith Greenaway's paper on Arctic Sovereignty that respectively start and conclude the main body of the proceedings. On one hand it has been the adaptation or evolution of an appropriate technology in the context of a local environment that has enabled the north's indigenous populations to survive and thrive; on the other hand technological changes introduced by other cultures from other regions have given the north (perhaps unwittingly and unwillingly) a role in both a national and international context - it has made it a domain of the south.

Between these two extremes of scale and complexity lie papers discussing various features of various technological applications to the north. Stenbaek and Bravo discuss applications and implications of modern communications technology - the former stressing its application in restoring cultural and community cohesion, the latter arguing that the medium may well adversely modify the communication between the very groups that it intends to promote. A plea for the pre-eminence of cultural and environmental considerations in community design is made by Xenia Zepic, and Norman Pressman echoes this theme while arguing that modern building technology should enable us to develop far more appropriate built form for the northern environment.

Paul Gray passes a somewhat critical eye over disparate attempts to map wildlife and associated phenomena in the NWT. He argues that the only legitimate approach is an interdisciplinary approach and that modern computer technology (in the form of Geographic Information Systems) provides a mechanism for the integration and synthesis basic to such an approach.

The application of G.I.S. to the mapping of Land Claims in the Yukon is the subject of Banting and Duerden's paper. Although this work illustrates the application of a "high-tech" approach to resource allocation problems facing indigenous populations, it really fails to address the question of the extent to which this technological application is alien to the client population. It is Rick Riewe whose paper dwells upon the results of the Land Claim mapping exercise that he conducted on behalf of the Tungavik Federation of Nunavut who produces tangible results through community based application of conventional cartographic technology.

Frank Duerden
Ryerson Polytechnical Institute

TECHNOLOGY AND THE NORTH

Keynote Address

Robert Page

Trent University, Peterborough, Ontario

When Frank Duerden approached me some months ago to give these opening comments, I had the feeling that I was being asked to do Mission Impossible. He suggested that it be something profound, philosophical, controversial, and confined to 20 to 25 minutes. I am afraid I can only promise to succeed in the last of the four. I see this merely as some opening shots to lead off the conference. Thankfully more detailed sessions are to come to correct the raw generalizations of this paper.

In addressing this topic of Technology and the North I am acutely aware of its intense interdisciplinary nature and my own limitations as a historian, environmentalist, and dabbler in public policy. The topic demands integrated analysis of disparate fields from engineering to social anthropology with the ethics of public policy lurking in the wings. As a precondition to any such study we must recognize our own ethnic, class, and educational backgrounds and the barriers that they create for cross-cultural research. What I learned from books I have had to unlearn from Dene elders. Secondly our own society and ideology is based upon the evolving commitment to technology which has been the basis of our liberal Idea of Progress. Thirdly our own values reflect the possessive individualism of free enterprise not the communal values of a subsistence economy. Technology is an integral part of the Growth Ethic of the modern industrial state whether Marxist or free enterprise. Thus Dene and Inuit society is ideologically different from either of the two poles of political analysis which we have traditionally used. We must remember that it is not just the physical reality of technology that is disturbing but that it is the symbol of even wider and more pervasive change.

Technology by its very nature is a means of cultural expression; it is not value free. George Grant writing in 1969 stated: "In this era when the homogenizing power of technology is almost unlimited, I do regret the disappearance of indigenous traditions, including my own. It is true that no particularism can properly incarnate the good. But it is also true that only through some particular roots, however partial, can human beings first grasp what is good."[1] It could be argued that if technology is a vehicle for the erosion of southern Canadian culture (as Grant argues) how much greater is the threat faced by northern Dene or Inuit. This is at the root of the struggle for cultural identity and self-determination; without the former the latter is an empty shell. Technology is an important ingredient in that perceived threat.

In spite of government policies and actions, there remains a built-in conflict between impacts of technically complex megaprojects and the

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[1] George Grant, Technology and Empire, (Toronto, 1969), p. 68.

traditional subsistence economy of the North. The first assumes massive economies of scale to overcome the high delivery cost to distant southern markets where the delivery system creates greater impacts than the resource extraction. Successive governments of Canada since the early 1970's have been committed to proceeding with arctic megaprojects as soon as the economics become viable. This commitment is based upon the industrial contracts for the South and the R & D from developing new pipeline and tanker technology not the added benefits of jobs and tax revenue for the North.

As we look to the 1990's it is important to be clear about that policy thrust for the time when oil prices resume their upward climb. Fortunately we have been given a lull in the development surge which we must use for research and the settling of land claims before the new wave hits, as inevitably it will. Yet the traditional economy of the North is based upon an ecological equilibrium and biological sustainability; it assumes a conservation ethic and land use planning not yet in place. I can remember listening at the National Energy Board to the corporate arguments for the Arctic Pilot Project where it was stressed that the development of this new technology alone justified the government's support irrespective of the opposition from the Baffin Region and Greenland Inuit. One began to feel that the technology of the project was developing a momentum of its own. Canada would achieve a new status by being the world leader in arctic marine LNG transportation. I have no doubt that there was a real sense of excitement for those working on the project. Engineers quite naturally come to feel an intense interest in seeing their designs converted from the drawing board into reality. J. Robert Oppenheimer in talking of one nuclear invention he was involved with, stressed that it was "technically so sweet that you could not argue" against its adoption.[2] In going through regulatory hearings I have seen that same sense of fascination with engineering virtuosity which can divert attention from the overall rationale of the project or local impacts.

The circumpolar North has presented some of the greatest challenges for the engineering profession in the 20th century. All construction must be based upon a firm foundation; yet in the Arctic because of land-based permafrost and marine ice scour, permanently stable foundations are difficult to construct and even more difficult to maintain. In the unprecedented geophysical conditions north of 60^{0}, we require unprecedented geotechnical responses. In many cases there were not established practices to build on. In assessing the adequacy of northern pipeline design, we were continually falling back on computer simulations in the absence of similar projects. This is one of the principal reasons why the cost estimates for the Trans-Alaska Oil Pipeline (ALYESKA) went from $900 million in 1969 to 8.5 billion when completed in 1977. In Canada, Arctic Gas in the final week of the Berger Inquiry withdrew their technical design for coping with frost heave and announced they were starting over. Their consultants were the best and most experienced in the world but they underestimated massively the potential for moisture migration through the frost front surrounding a chilled natural gas pipeline, therefore the cumulative buildup of ice lensing, and in turn the

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[2] H.F. York, The Advisors: Oppenheimer, Teller, and the Superbomb, (San Francisco, 1976) pp. ix & 81.

potential for frost heave over the 25 year life of the pipeline.

In watching the Arctic Gas team grapple with this problem of technology, one had the sense that they were continually seeking the "technical fix" that would solve their problems. But this search led them into more and more complex science and engineering. Each adaptation to solve one problem seemed to open the way for one or two new ones to emerge. They seemed intent on confronting nature rather than adapting to and working with the physical forces present. The absence of any empirical data on heat probes and heat tracing for similar projects in permafrost made the whole exercise a study in guesswork. The purpose of these comments is not to denigrate Arctic Gas and their consultants. Their research was probably the most advanced in the world. Those of us who went through the hearings came away with a new sense of the physical power of the arctic environment and a new understanding of why Alyeska had cost overruns of over 900%. Peter Williams in his book on permafrost concluded: "It may seem surprising in view of all the accumulated evidence, that there is still little agreement about what is actually going on in frozen soils, and in particular, disagreement about the precise, quantitative description of the process of freezing and thawing in porous materials."[3] Yet it is essential for us to understand precisely the nature of the geophysical forces at work in order to design the necessary geotechnical response. Many went into the debate on the Mackenzie Valley Pipeline with a clear idea of what was involved; after it was over no one retained that same certainty. One of the great strengths of the Berger Inquiry was that it had the time and the determination to unravel these problems which the greater expertise at the NEB and FPC failed to do.

In considering the introduction of new arctic project technology, it is essential to have thorough risk and impact assessment before approval. Unfortunately there are current trends which raise concern. In spite of the splendid efforts of people like Fred Roots, the role of science in the federal government is declining. Yet independent in-house scientific assessment is critical in many areas of public policy and enforcement. In addition the focus of scientific work which is done, is moving away from the pure sciences to applied areas in support of business. In the North I think that this is particularly regrettable where there is still so much research to be done. I hope that a new National Polar Institute may help to counter this trend. It is important to remember that in the 1970's pure research played a critical role on a number of development questions; Berger would never have found the geotechnical flaws in the Arctic Gas application without the work of government and academic scientists.[4] We are also proceeding through an era of deregulation where there is pressure to abbreviate the procedures of the National Energy Board, EARP, and other bodies involved with technical assessment. In the North some of the most difficult technical adaptations still lie ahead; especially in moving from temporary exploratory drilling Caisson Retained Islands to permanent production platforms facing the full brunt of all year ice pressures.

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[3] P. Williams, Pipelines and Permafrost, p. 81.

[4] On frost heave, the work of Peter Williams from Carleton and John Fyles on loan to Berger from the Geological Survey of Canada.

Technical assessment and regulation also raise problems for the Nunavut and Denendeh negotiations. The thrust of both these proposals is for decentralization of political control especially in dealing with land use issues. However, megaprojects with their complex planning seem to promote the reverse. Let us take the example of the Alaska Highway Natural Gas Pipeline approved by Washington and Ottawa in the summer of 1977. All the jurisdictions of the Canadian Government with responsibility related to the project were concentrated in the Northern Pipeline Agency. This agency if it deemed it to be in the public interest could exempt the project from normal regulations of government such as those related to the environment. With these types of fast track administrative structures local concerns will have even greater difficulty being heard than through the normal DIAND structures. In addition, FERC in the United States is very reluctant to pass on to American consumers special costs incurred in Canada by pipeline companies even though they may be part of the Canadian regulatory regime. Hence the scale of the technology creates constraints on the Canadian autonomy and the freedom for Ottawa to negotiate with the Dene and Inuit.

The issue of technology has international implications in a number of other ways including: the Arctic Water Pollution Prevention Act; the design and purpose of the Polar Eight; drilling in the Beaufort Sea and the migration of oilspills; and the new defence installations being considered for the High Arctic Islands. Some of these will be dealt with in other papers and I leave it until then. One issue I would like to touch on relates to the American proposal to seek Congressional approval for drilling in the Arctic National Wildlife Refuge, along the north slope just east of the Yukon border. A decade ago, as part of the public debate on the Mackenzie Valley Pipeline, the Berger Inquiry recommended that the Porcupine Caribou Herd calving grounds be protected as a north Yukon wilderness park and this was later done to complement the American portion of their habitat which had already been declared a wildlife refuge. The area being proposed for drilling includes 78% of the core calving grounds. In February of this year the Canadian Department of External Affairs filed a formal protest in Washington documenting Canadian concerns about impacts on caribou, Lesser Snow Geese, polar bears, fish, and marine mammals. The "risks associated with opening the coastal plain to development far outweigh the potential benefits" and "would entail unacceptable damage to Canada."[5] Recently the Reagan administration announced its support for the legislation. Thus this coming fall and winter in Washington will see public hearings once again on the Porcupine Caribou Herd and technical impacts on wildlife. In this instance, however, the Department of the Interior's own study admits the possibility of "a major population decline" and shift in the distribution of the herd.

Technology in the North when carefully handled has the potential for environmental and social benefits as well. Laser technology may provide a major step forward in our ability to clean up oil spills; submarine tankers and submarine oil production facilities in the next century may provide the answer to the problem of Beaufort Sea production in the deeper waters; and the

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[5] Position Paper of Canada on the United States Department of the Interior Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment, 3 February 1987, Ottawa.

list could go on. The Inuit are attempting to counter the impact of southern communications technology by establishing their own television network. In the future the positive must be weighed against the negative and the people of the North allowed to pick and choose what is appropriate.

In conclusion, technology is a two-edged sword with economic benefits and often socio-environmental costs. Too often those who receive the benefits do not bear the costs. Megaprojects are the ultimate form of technology with immense implications given the isolated sensitivity of many parts of the North. Technology must be a means to achieve northern goals not a proving ground for pilot projects where technology becomes the end not the means. Technology when applied must be on the basis of sustainable development as defined by northern priorities. In the immediate future small may not be beautiful but it may be manageable.

INUIT SKIN CLOTHING TECHNOLOGY

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Last October, at a Tungavik Federation of Nunavut meeting in Igloolik, Guy Kakkianiun of Pelly Bay announced "I just heard that my son is lost on the land. If I only knew he had skin clothing with him I would know he was alright". For generations, Inuit seamstresses practised a complex skin clothing technology that met their cold weather clothing needs. Today, modern technological advances produce poor substitutes for caribou skin clothing, frequently with disastrous results when used for arctic expeditions.

Skin clothing is usually unnecessary within the protective boundaries of northern settlements, however elders recommend taking caribou skin clothing whenever venturing onto the tundra. Caribou skins are preferred over other northern animal skins and modern insulative fabrics. Unlike other arctic animals, caribou hair has a honeycomb-like hollow core (Adorjan and Kolenosky, 1969). Air is trapped inside each hair, as well as between each of the densely packed hairs, providing an excellent insulative layer. In addition, caribou skins "breath", allowing body vapour to pass through and reducing perspiration. Body vapour freezes to the caribou hair and is easily beaten off with a wooden or bone beater, restoring the insulative value. Some types of insulation, such as down and down substitutes, provide only temporary protection. In the extreme cold, body vapour collects within the down, freezing and replacing valuable air pockets (insulation) with ice. After several days, down clothing becomes an icy coffin unless it can be thoroughly dried indoors (Riewe, 1975; Stefansson, 1955).

Inuit developed a complex set of tools and procedures which transform stiff, brittle caribou skins into soft, durable and insulative material (Birket-Smith, 1929; Boas, 1888; Gabus, 1944; Manning and Manning, 1944; Stefansson, 1945). Skin consists of fibre bundles fanning out from the centre back to the neck, belly and rump areas. The alignment of the fibre bundles influences the skin's strength, flexibility and extensibility (Haines, 1981). Fat and lipid cells are broken and fibre bundles are realigned by scraping

with a dull scraper. Inuit complete the first scraping by following the general direction of the fibre bundles to avoid excess stretching. Then the skin is scraped from head to tail, crossing the fibre bundles at right angles in order to stretch the skin. During the softening process, skins are dampened. According to Young (personal communications, 1986), dampening skins stimulates autolysis and cases depolymerization of ground substance which helps to soften the skin. Extra water is added to dry areas; too much water loosens the hair while too little makes the skin dry and brittle. Scraping is repeated, forcing the fibre bundles in the corium layer of the skin to become almost parallel to the lower edge of the skin (Young, personal communications, 1986). The fascia is then removed with a sharp scraper, creating a soft, velvet-like finish. Today, some Inuit sprinkle flour, baking powder or baking soda over the skin before scraping. These grainy substances act as an absorbent and fine abradent, making the final scraping a bit easier. Occasionally sand paper is used, however many women find it unsatisfactory as the final scraping also breaks up a few more fibre bundles to produce a more pliable skin (Oakes, in preparation). Elders continually stress the importance of working with skins in a cool place, such as an igloo, to prevent them from drying out.

Today, commercially tanned skins are readily available from the Winnipeg Fur Exchange, Co-operatives and Hudson's Bay Company stores. Commercially tanned wild mink is occasionally used for inner and outer parkas, although it is considered too fragile for long lasting garments. Commercially tanned Arctic hare, rabbit, cowhide, sheared sheep and seal skins are made into inner or outer parkas, skin boots, mitts and wall hangings. Commercial and home smoked caribou skins are available through commercial outlets and intersettlement trade. White parka trim is cut from commercially tanned white rabbit or sheared sheep skin when white-haired caribou belly skins are unavailable. Modern tanning technology is unable to match the results of time tested traditional caribou skin preparation techniques. Commercially tanned caribou skins are inferior to home softened skins; the hair sheds and breaks easily, and the skin disintegrates when wet.

Inuit ancestors are acknowledged for developing the first tailored garments, the forerunners of tailored suit styles (Horn, 1975). Inuit cut skins into intricate patterns using hand, string and eye measurements (Angugatiaq, 1973; Hatt, 1914; Mathiessen, 1982; Oakes, 1985; Pharand, 1975). An acute understanding of caribou hair direction, thickness and colouration, combined with an experienced eye for proportions and pattern silhouettes enable seamstresses to create well fitted garments. In contrast, southern pattern designers require french curves, tape measures and pattern sloppers to duplicate Inuit styles.

An advanced understanding of the physical properties of each caribou skin is needed to make the best cut. For example, the parka's broad shoulder area is positioned over the caribou's upper leg. The change in hair direction from the caribou's centre back to leg area covers the armscye seam. The scantily haired axilla (caribou's armpit) is cut away, creating the garment's indented armholes. In addition, unlike mass-produced southern fashions, northern designers make patterns that are unique to a specific Inuit group. For example, the coastal Caribou Inuit (Paallirmiut) cut their shoulders about one finger length broader than inlanders (Ahiarmiut). These differences are significant to local seamstresses although outsiders generally overlook them.

When looking at broader Inuit groups (Central, Eastern and Western), differences in patterns are more obvious to outsiders.

Originally, skin parkas were cut and laced together (Horn, 1975) until technological developments, including fine bone needles, caribou sinew (thread) and waterproof stitches were used to assemble skin clothing. Today, metal needles, synthetic thread and leather sewing machines are available, however parts of the traditional technology remain the most effective. Triangular glover's needles make skin sewing easier as the needle makes three tiny cuts around each needle hole. These cuts are enlarged by the thread, loosening and weakening the skin. Inuit seamstresses recommend straight, round metal needles even though it is harder to push the needle through thick skins.

Traditionally, caribou and whale sinew was used as thread, today it remains the best type of thread to use. Moisture causes sinew to swell, occluding the needle holes, and the stitches to tighten. Waxed thread, purchased from the Hudson's Bay Copany store or Co-op, is the best substitute available, however it frays and stretches. Unlike sinew, synthetic threads are unaffected by changes in humidity levels and resist against the expanding and contracting skin. The resulting stress causes premature wearing of seams.

In order to produce waterproof seams, Inuit developed a waterproof stitch for boots and seal intestine parkas. The seam is sewn by penetrating only half way through one skin; therefore, moisture is restricted from entering directly into the garment via the needle holes. In the late 1800's, this stitch was adopted by western medicine as the best stitch to use to prevent leakage when stitching up intestines and bladders. Modern fur and leather sewing machines are unable to duplicate the waterproof stitch. Neither are they able to manufacture the crimping and tailored aspects of Inuit styles. Inuit seamstresses mold moistened seam allowances in order to achieve the desired fit. Tiny tucks and pleats become invisible once they are moistened and forced into their desired shapes. This is not possible on leather sewing machines, Inuit patterns are altered to accommodate the machine's limitations rather than the wearer's needs.

Caribou skin clothing contains design features that provide excellent protection against cold weather. An important feature is the built-in hood. Over 80% of our body heat escapes through the head, creating a terrific cooling effect. Inuit hunting parkas are made with the hood fitting closely to the face. The hood is usually cut as an extension of the back pattern, eliminating a drafty neck seam. Unlike tunnel hoods, Inuit hood styles barely cover the ears and cheek bones. This style feature allows the wearer to move his head freely and retain his peripheral vision while hunting. It also eliminates the problem of excessive frost building up on the hood opening (Riewe, 1975).

The pull-over style used by Inuit eliminates buttons, zippers and other fasteners. These fasteners are difficult to replace or repair, especially considering the lack of shopping markets spread across the tundra. Breakage could lead to frozen skin or death if temporary repairs were impossible. Metal parts, such as zippers, also cause frost bite on the throat and chin, and freeze open or shut in the extreme cold.

Hunting parkas are designed with a dropped shoulder and armhole seams. By dropping the shoulder seam towards the shoulder blades, less stress and weight is placed on the stitches in this seam. The dropped armhole seam reduces stress and also allows for an enlarged armhole area. Seamstresses stress the importance of making the armhole large enough to allow the arms to slip easily into and out of the sleeves. During extremely cold weather, while sleeping or while waiting for an extended time at a seal hole, the arms are slipped out of the sleeves and crossed over the torso to help maintain the core temperature. Large armholes are also needed in order to slip an outer parka over an inner parka easily. Peter Alareak (Eskimo Point) states another reason for large armholes. He recalls being told to "... take my arms out of my skin parka sleeves when I was sitting around with my parka on. So my armpits wouldn't make my parka smell like a weasel".

The parka, pant, mitt and boot ensemble fits together neatly, creating a warm environment by trapping hot air and circulating the air around the body core. The parka fits loosely over baggy pants, allowing the hot air to rise up the pant legs and circulate around the torso. The closely fitted neckline restricts the hot air flow, venting the hot air around the face. Sleeve cuffs are designed large enough to allow mitts to be slipped on and off easily, yet small enough to prevent drafts. When extra ventilation is needed, mitts are removed so hot air can escape out the sleeve openings.

Another well engineered, durable, cold weather garment is a caribou leg skin mitt. Peter Mikiyuniak (Eskimo Point) demonstrated how the mitts are worn. He submerged his hands into some snow, sprinkling a small handful (about 1/8 cup) into the mitt before inserting his damp hands. The mitted hands are manipulated, wrung and beaten together. When the snow melts, the leg skins begin to soften and the humidity level rises; soon the mitts become warm and pliable. This process is repeated when necessary, providing an extremely comfortable environment.

Women's parkas are designed for warmth as well as convenient infant care. A pouch is built into the back pattern and is enlarged or reduced to suit the baby's size. Babies spend a large portion of their first years nestled in their mother's parka pouch and receiving generous amounts of social interaction between the mother and whomever she is visiting. When it's time to breast feed, the mother simply slips her arms out of her enlarged sleeves and turns the parka completely around so the baby is still sitting in its pouch but the pouch faces the mother's front. Another feature of women's parkas is the long back tails which provide an ideal windbreak for children when they need to defecate or urinate.

Southern winter enthusiasts who enjoy moderately cold weather are turning to traditional Inuit parka styles for long term, cold weather protection. Many wear pull over, hooded parkas made from firmly woven cotton-polyester fabric trimmed with wolf or dog. Inner parkas are made from duffel, old mink coats, otter, muskrat, rabbit and a variety of other fabrics or skins available in the south. Simultaneously, some northerners travel on the land in winter with inadequate clothing. Every year a tragic death occurs when a scantily clad Inuk is caught unexpectedly on the land. Elders all across the Canadian Arctic share a common concern over their young people's health. They advise never to travel on the land without either wearing caribou skin clothing or lashing it to the komatik in case of an emergency. Traditional caribou

skin clothing continues to provide the best cold weather protection, especially for overnight trips that are extended due to storms.

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IN SEARCH OF NORTHERN HABITAT

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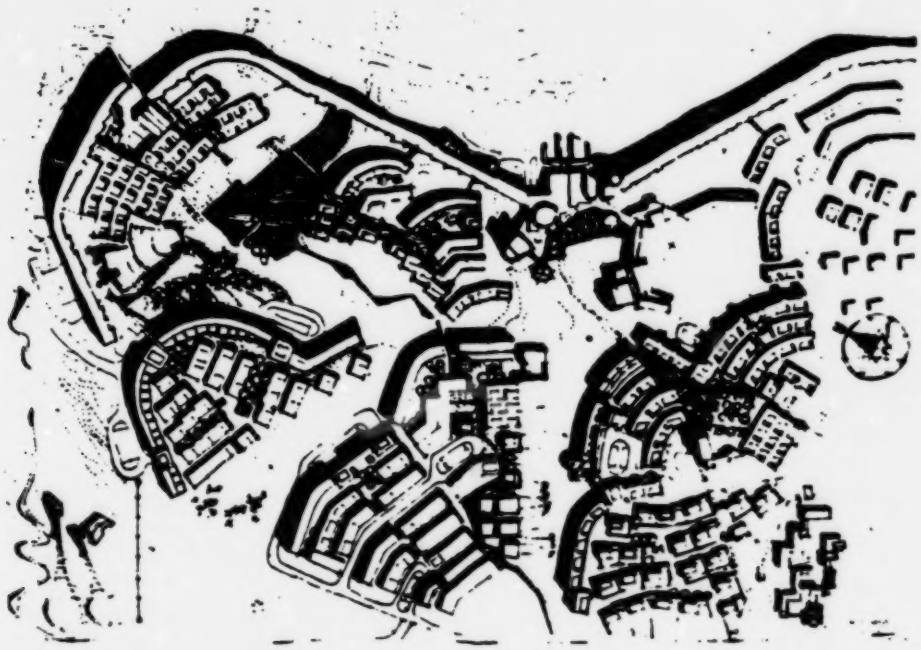
The beginning of the 50's marked an era of grand plans and mega-projects in city planning. The brave new world was embarking on a path of rapid change caused by expanding technology and mass production.

Urbanization was reaching into areas with harsh climates where only few settlements existed and where building was extremely difficult and costly. Here the new technology met the traditional ways of the indigenous peoples. In their long history of adaptation to climate and nature, they had developed shelters best suited to their environment and their life styles. The igloo, the wigwam, the turf house or the long house were testimony to the ingenuity of the native peoples in their ability to construct environmentally responsive and relatively comfortable dwellings.

With the opening of the North to non-natives, the need for a more permanent and more complex settlement structure, responsive to a different life style, became a necessity. The imposed development patterns and forms reflected the prevalent styles of more temperate regions. Compared to the indigenous peoples, these new northern habitations failed miserably in providing environmentally responsive solutions to community needs. Despite their poor performance, their form and planning practices have been perpetuated throughout the North.

Figure 1



Original plan of Svappavaara, Sweden
designed by Ralph Erskine

In the early 1960's, the Swedish architect, Ralph Erskine, articulated for the first time social and climatic criteria, through the built form, for an Arctic town. Located on a southwest slope, overlooking a group of lakes, the town of Svappavaara in northern Sweden (Fig. 1) embodied the principles of climateresponsive design through the use of a "wind screen" building and continuous indoor walkways linking residential areas with the town centre. This concept was unique and revolutionary and held great promise for a more habitable and hospitable northern environment.

The "wind screen" concept was applied in Fermont, northern Quebec, but the rest of the town site was more loosely developed, departing from the uniformity and compactness of Erskine's concept. A settlement at Resolute Bay, planned for an ultimate population of 1,200, by Erskine in collaboration with Bonnetto/Derome, was never completed. Why has Erskine's concept not been more widely accepted?

Several reasons could be cited for not pursuing the development of compact and more dense communities in the North:

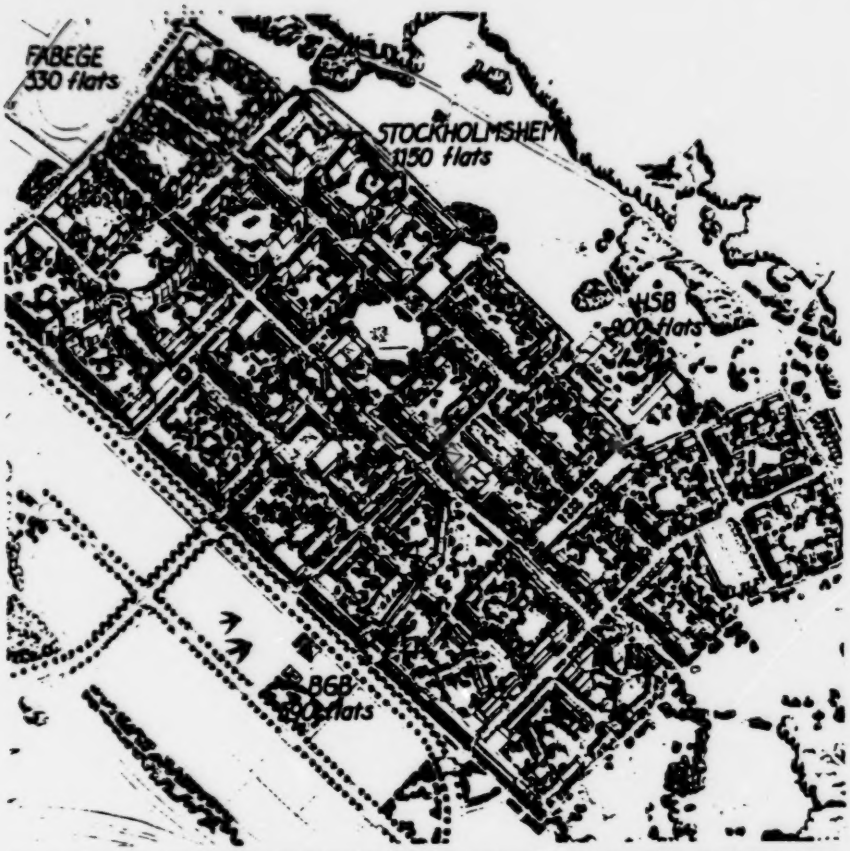
(i) Design comprehensiveness and the large scale of such projects are the major drawbacks in their implementation. Phasing and alteration to the design is difficult, since infrastructure and utilities for the total site have to be provided prior to the start of construction. Funding has to be secured upfront for the total project and, therefore, the design cannot be adjusted to reflect market forces.

(ii) Non-native residents experience difficulties in adjusting to the North. The economic, social and natural environment makes arduous demands on its inhabitants. The cold and darkness of winter months in northern latitudes require more time to be spent indoors. Family members are forced into more constant contact with each other. Consequently, the need for privacy increases. "Cabin fever", alcohol and drug abuse are frequent phenomena of living in a confined environment. These problems are aggravated with any reduction in dwelling unit size and increase in density required by the economics of development. The desire to live in communities with "small town" qualities implies low densities, large lots and direct access to the surrounding wilderness. This has resulted in an urban form which is often inefficient, expensive and socially difficult to maintain.

Consequently, northern housing preferences can be in conflict with the need to develop comprehensive, compact, energy efficient and climate-protected communities utilizing state-of-the-art technology.

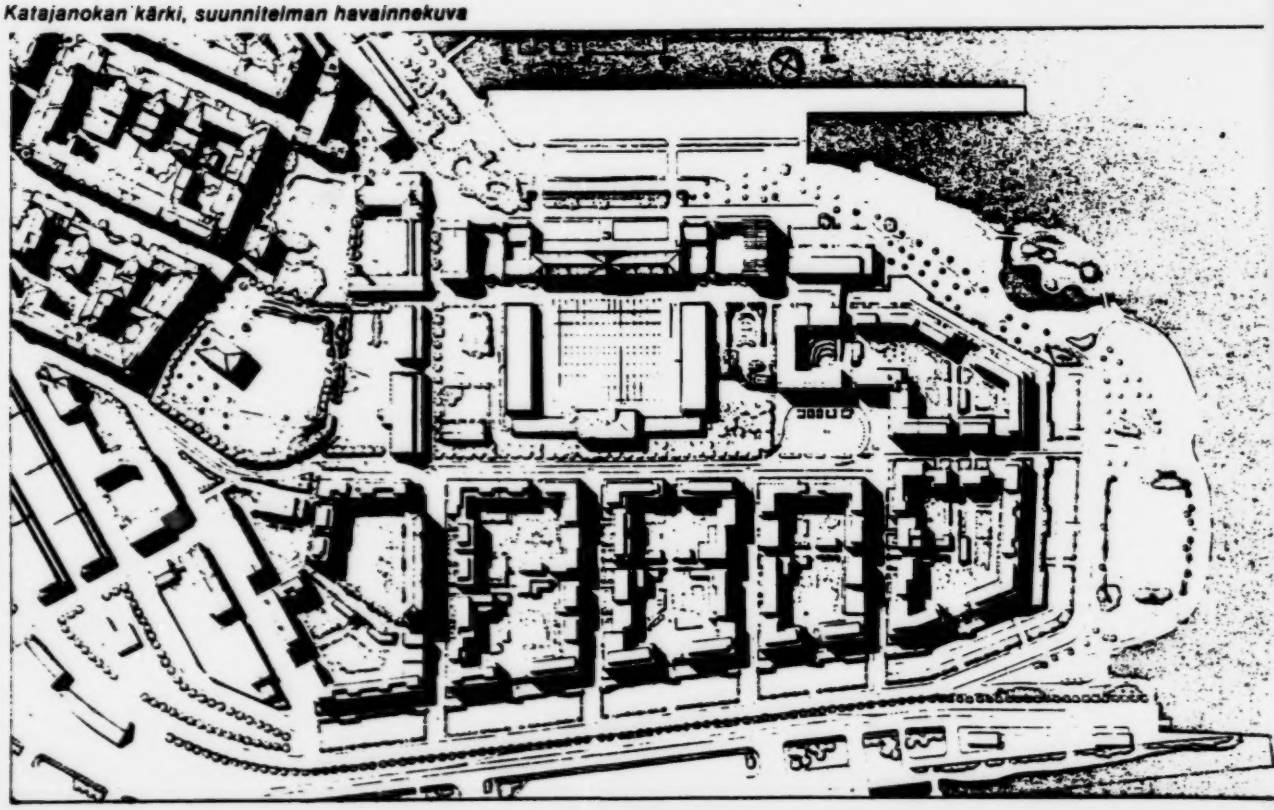
(iii) The economic vulnerability of resource towns has influenced the policy of overall settlement distribution in the North. More recent trends mark a departure from the earlier practice of building permanent resource communities. The new approach within Canada supports the growth of already established communities, which have basic infrastructure, social and administrative services capable of further expansion. For short term exploration activities, work camps and temporary "enclaves" are becoming more commonly used. They tend to provide a high quality environment for workers living without their families. Rather than investing in permanent communities which, because of their single industry nature, easily become victims of failing economies, emphasis will be placed on the provision of non-permanent types such as Prudhoe Bay Enclave in Alaska.

Figures 2 and 3



A new town is being developed on the Skarpnäck fields. The housing will later be joined by an industrial district

Katajanokan kärki, suunnitelman havainnekuva



New housing forms

Changes in planning principles and housing form are also in evidence in the more urbanized parts of the circumpolar countries. The last energy crisis of 1973, followed by the economic recession, had a lasting impact on consumer demands and expectations regarding housing form and its performance. The building industry, encouraged by government, responded through improvements in the quality, design and durability of structures. Energy conservation and the level of comfort became primary factors in the design and production process.

In addition, changes in demographic structure, such as declining population, reduction in family life, increase of the elderly, throughout the industrial world (which encompasses all cold climate countries), have been influencing current residential and community designs. The Scandinavian countries, including Finland, are responding to the demand to produce a better social environment within physical structures which are energy-efficient and climate-responsive.

After the popularity of large housing estates in the 1960's and 1970's, attention centred on redevelopment and infill within existing urban centres, to take advantage of the available infrastructure and building within the historical city fabric. Using older urban patterns as models meant making a number of new priorities. While the primary component of functionalism's doctrine was the individual building - as part of the whole - the basic premise of current planning is that the whole takes precedent over the parts. Consequently, courtyards, streets and squares are becoming almost as important as the buildings themselves. The examples of such new planning approaches are found in many recently built residential projects.

Skarpnack (1983-1987) a suburb of Stockholm (Fig. 2), is laid out in the grid-iron pattern of a 19th centure European city. The high density of 120 dwelling units per hectare and the mix of uses provide an intense urban environment while still retaining the human scale. The principle of a "wind screen" building has been applied in this project creating an improved microclimate within the courtyards in order to accommodate children's playground areas, allotment gardens and community facilities.

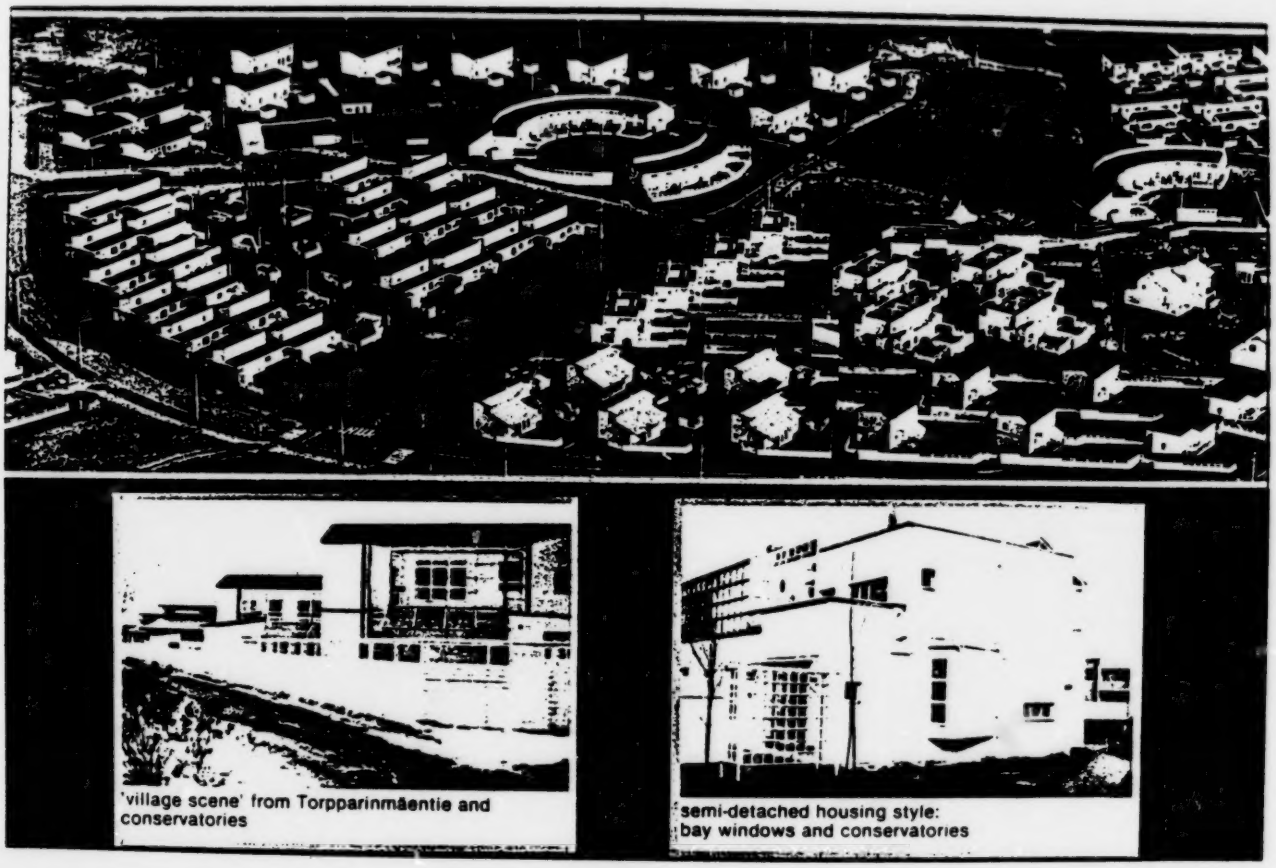
Katojanokka - Helsinki (Fig. 3), is another recently (1986) developed project in the centre of the city which utilizes the grid-iron street system and the courtyard concept to maximize integration with the existing city fabric and improve climate.

These projects clearly demonstrate the benefits of micro-climatic measure in extending the use of outdoor spaces for longer time periods.

In response to energy conservation needs as well as special requirements posed by various population groups, the new concepts in neighbourhood design have been developed and promoted through housing exhibitions which are held every second year in Scandinavia.

The "Helsinki '83" home show in the suburb of Torpparinmaentie, Finland (Fig. 4), demonstrated the use of passive solar energy through subdivision orientation, street layout and housing design.

Figure 4



'village scene' from Torpparinmäentie and conservatories

semi-detached housing style: bay windows and conservatories

The BO'85 - Uppsala, Sweden, on the other hand, demonstrated the imaginative re-use of townhouse blocks built in the 50's and 60's to suit the needs of the emerging population groups in the 80's including the elderly, single parents and singles. In addition, new apartment blocks and groupings of individual housing units around common enclosed spaces were designed to show the adaptability of such internal spaces in meeting the needs of those different groups.

The most innovative complex which is already serving as a prototype for other residential, low density projects throughout Sweden is "Gardsakra" in Eslov, near Malmo (Fig. 5). A 376 metre long glass-enclosed street links 126 housing units in six blocks. Dwelling units are contained in 2 storey town-houses or in 2 storey apartment blocks. The enclosed street serves as an extension of the private living space. The glass-covered street acts as a passive solar collector and no additional heating is used for the public spaces. Architecturally, the project unifies the element of traditional rural living with a highly urban form in an effort to conserve both energy and land.

An innovative housing project in Gardabaer, Iceland (Fig. 6), a small town 5 km. south of Reykjavik, demonstrates the versatility of glass as a building material suitable for northern habitations. The Alvidra Housing

Development consists of three separate and two inter-connected "round houses" with a total of up to 125 house and apartment units. The large glass-roof spans a central garden accessible to all units, as well as over individual patios. The recreational facilities within the garden can be used all year round. Construction started in 1985 and the project will be completed by the end of 1987.

The conservation of land is considered one of the main objectives of Swedish national policy, second to energy conservation and food production. In Canada, a very limited number of municipalities use energy-efficient planning criteria as a basis for physical development. The cost of servicing as well as the actual waste through unproductive use of land within residential areas have, as yet, not been seriously addressed. In regions with cold climates, where open space (required by the existing zoning by-laws) in front and back of dwellings can hardly be used for more than 4 months of the year, such passive use of the land appears unjustified.

An alternative and potentially more productive idea might be to reduce lot sizes and create semi-private enclosed allotment gardens which would not only provide recreation but also a measure of employment within the community. "Gardens Under Glass" could become a feature of the month.

Rethinking the vernacular

With acceptance of post-modern architecture as the legitimate style and the expression of the post-industrial society, interest has been re-focussed on the vernacular building form, which best expresses social and cultural values in a local context.

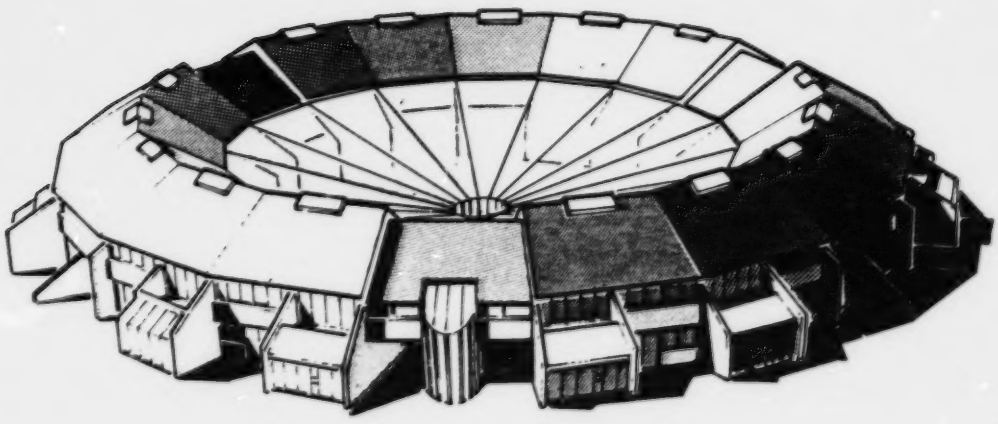
Examples of innovative and imaginative use of vernacular forms in the contemporary architecture of northern cities are scarce. Only recently have the possibilities of enriching building form through the application of vernacular elements been explored. The more imaginative use of the vernacular has been pursued in several projects across Scandinavia, primarily for energy conservation purposes. A proposal for the Lapp's residential community in Finmark, Norway, draws its inspiration from the original Norwegian turf house partially built into the hillside. The arrangement of the unit's interior reflects the life style and work requirements of its residents. Would it not be appropriate at this time for the peoples of northern Canada to re-examine the use of their vernacular heritage in conjunction with the new technology in order to seek a unique and responsive approach to cold-climate habitation?

Conclusions

The buildings, villages and towns of the past which have grown slowly and evolved gradually in response to social, political, cultural, economic and climatic forces tend to be more responsive to human needs than the communities which were "planned" and built in a short period of time. These were not given the opportunity to develop mechanisms of sensitive adaptation to the requirements of their users. Without exception, the vernacular, traditional form, has always been a direct expression of life's realities embodying specific functions and activities while satisfying local needs from a culture-specific viewpoint and social perspective. Social values, building materials, orientation, climate and site have been uniquely woven together producing a

Figures 5 and 6

Alviðra Housing Estate, Garðabær, Iceland



form which is inventive, responsive and of human scale.

The tradition of intense development in the North is very short. The housing forms built throughout this vast area are constantly in the process of being improved and re-evaluated with respect to their design and construction techniques. The search for a responsive northern habitat is an ongoing task. It is imperative that the future building form draw its inspiration from the best examples of the vernacular types (e.g. earth-sheltered structures, igloos, etc.) while applying appropriate technology which will facilitate production, reduce costs and increase its life span.

Countries in cold climates must reflect cultural predispositions and needs related to life style demands and preferences.

Applied climatology, a relatively new field of study whose aim is to integrate climatic consideration in the various stages of building, planning and policy, can make a powerful impact on urban development. Effective "winter planning policies" can only be achieved if these are, conceptually and practically, made an integral component of the comprehensive planning, development and design process. Applications of the basic principles will have to be simultaneously applied to the micro-, meso- and macro-levels of the urban pattern if "cities in the cold" are to be re-shaped and reorganized in more human ways. Coordination amongst all the disciplines involved in ameliorating urban living under harsh conditions will be essential. Through interdisciplinary collaboration, planners, policy analysts, environmental sociologists and designers have the potential to become more socially responsible.

The quality of urban living has to be improved continuously: community and individual awareness has to be increased and urban dwellers have to be sufficiently well informed so that they may participate meaningfully in collective decisions influencing their life style.

Government, together with citizen's groups, should be jointly involved in revising existing policies and re-evaluating projects. Various levels of the public sector, which are responsible for managing and developing our communities, should undertake demonstration projects which would test new ideas in northern habitability. Large-scale home exhibitions, competitions and educational programs are some of the means which can be used to obtain visibility and greater comprehension.

In this way the most important missing element, public awareness, can be politicized as an instrument of environmental change.

PLANNING NORTHERN COMMUNITIES IN THE FUTURE

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I. Introduction

What is meant by "north"? What factors constitute "northern conditions" with respect to design criteria, planning, and management of human settlements? There are many interpretations based on considerations such as latitude, climatic elements (e.g. temperature, precipitation, seasonal variation), incidence of vegetation, location of the treeline and cultural perceptions of what constitutes "cold". Land and water mass, ocean currents such as the Gulfstream, and winds, influence climate where the northern latitudes are concerned. Other factors in attempting to define "north" are the number of days of continuous permafrost or of freezing periods. Also used are heating degree-days (usually determined from long-period mean temperatures or normals), which are accumulated temperatures below a base temperature, calculated each season to obtain an idea of severity for heating and oil/gas consumption. (The base of 18 degrees C is selected on the assumption that no heating is required until the outdoor mean temperature falls below this value).

To some, the idea of "north" or "cold climate" is associated with heavy snowfall or intense, prolonged periods of temperature which cause both psychological and physiological discomfort. To others, darkness experienced at far northern latitudes may be more readily connected with "north". However, a harsh, cold winter climate is a relative notion, embodying five basic elements:

1. temperature - normally below freezing.
2. precipitation - usually in the form of snow.
3. restricted hours of sunshine/daylight.
4. prolonged periods of the first three factors cited above.
5. seasonal variation.

In general, "northern" or "cold" climate is accepted to be one where earth is covered by snow, where water is frozen, and where air temperature is below freezing during a considerably long part of the year.

The organization of functions and activities in both space and time is essential under conditions of severe, extreme climate. Lengthy exposure to bitter cold, to wind chill effects, to snow-covered or icy surfaces is not only perceived as a great inconvenience but it can also be highly dangerous and stress-inducing. It is hence of the utmost importance to develop and apply development policies and landscape planning based on micro-climatic principles in order to moderate the severity of climate on outdoor patterns as well as to create "protected" spaces for human activities.

When the planning process commences--either for new development or for redevelopment of existing areas--qualitative goals should be kept in mind for various activities and collective amenities. In addition to the social requirements of the user groups and target populations, and their economic

implications, the location and dimensioning elements of activity settings and the spaces between them must be heeded. Decisions must be taken on the primary factors vis-à-vis those which can be compromised. Choices must be viewed within the overall stated objective bearing in mind that accessibility and climatic constraints must be seen as vital features of designs and policies.

> Creation of the best possible micro-climate in all parts of the urban area, but especially in its residential sections, is an important criterion for a physical environment conducive to health and happiness.[1]

II. Critical issues affecting northern living

In the majority of situations occurring throughout the winter season, daily activities are greatly curtailed and, for some, such as the elderly, handicapped and very young, considerable hardships are created. Prior to formulating action strategies for reorganizing urban land, it is imperative to identify a spectrum of critical issues requiring high priority attention to be addressed by both the private and the public sectors. A possible classification can be catalogued as follows:

1. Physical realm

   a. Pedestrian protection

      This can be achieved through covered arcades and galleries, through-block passages and linkages, connected atrium developments, underground walkway systems, heated bus shelters, and other 'sheltered' projects integrated within the existing urban framework.

   b. Optimize accessibility

      An attempt should be made to reduce outdoor walking distances to transit facilities, parking garages and lots, major retail and institutional complexes, (e.g. schools and recreational centres).

   c. Organize development on an integrated basis

      Guidelines and policies--offering incentives whenever viable--should be instituted to promote improved urban designs, higher density mixed uses, energy-efficient urban forms (incorporating solar access principles and micro-climatic concepts), intensification of residential development and strengthening of transportation corridors.

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[1] Hans Blumenfeld, "Criteria for Judging the Quality of the Urban Environment", Occasional Paper, No. 14, "Contact", October, 1974, Vol. 6, Nos. 4/5, Faculty of Environmental Studies, University of Waterloo, p. 8.

d. Conceive public open space in relation to seasonal demand

Employ a 'seasonal approach' in the design, use and management of civic spaces and neighbourhood park systems to maximize use in each of the seasons. Multi-functional use is the crucial element. The creation of "winter gardens" and "indoor parks" at strategic locations should be built as pilot projects.

2. Social realm

a. Safety and health care

Public education should be implemented with a focus on cold-climate survival techniques: winter clothing, appropriate diet, winter fitness and winter driving skills (such as those taught at 'skid-control' schools).

b. Community snow removal

Progress must be instituted whereby assistance for snow clearing to both senior citizens and the handicapped can be obtained--as well as other groups in the population which require such help.

c. Policies for special needs groups

More efficient and strategic locational criteria for senior citizens' homes should be sought. Delivery systems 'to-the-home' of convenience goods, special mobile vans to get non-motorized inhabitants out of the house for medical reasons, social events or other purposes should be promoted.

d. Winter promotion events

Festivals, carnivals, ice-sculpture competitions, winter sport displays and other winter-orientated celebrations projecting positive images of this season should be actively encouraged.

3. Economic Realm

a. Transit assistance

Special vehicles (4-wheel drive) should be made available to needy groups when the normal transit system is severely impaired due to heavy snow accumulation or icy surface conditions. Fare reductions or "free-ride" days for "winter sale periods" could be sponsored by merchants' associations in business improvement areas.

b. Winter subsidy programs

Special grants or tax deductions can be made to low-income groups for heating, lighting, winter clothing, and insulation upgrading at home.

c. Tourism promotion

Grants and incentives to promote winter-orientated recreation and tourism should be given serious consideration.

d. Employment and retraining programs

These are particularly critical when unemployment figures increase due to seasonal variation in economic activity--as is found within the construction industry. Manpower, in such moments, needs to be redirected toward public works tasks, street maintenance of higher quality, and recreational facilities management.

III. Approaches to climate-responsive and energy-efficient urban form

Several approaches can be followed if climate-responsive and energy-efficient urban reorganization is to be achieved. These shall be imaged from a perspective of urban design concepts, policy development planning and implementation/action strategies.

Basic principles for energy-efficient planning[2]

1. Multi-use buildings

Buildings containing a diversity of uses or functions, e.g., shops, offices, residences, public facilities (cinemas, restaurants, post office, schools), can potentially minimize the necessity for movement--especially under inclement conditions.

2. Mixed land use

Mixing land uses within the urban configuration--as opposed to segregation of uses through traditional zoning practices (e.g., residential, retail, recreational, industrial, etc. uses have conventionally been dispersed throughout different zones of a city)--will reduce the need for commuting. This approach creates greater self-sufficiency at the district and neighbourhood levels.

3. Intensification of functions

This implies more intensive use of existing land which is vacant and awaiting development (as well as redevelopment), including urban infill. Services and housing are the usual fabric at the neighbourhood level although commercial and retail uses can be incorporated as can public transit installations. Where warranted by local market conditions, single-family houses can be converted to multiple-family use.

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[2] See Norman Pressman and Xenia Zepic, Planning in Cold Climates, (Winter Communities Series #1), Institute of Urban Studies, University of Winnipeg, 1986.

4. Higher densities

   In the residential, retail and commercial sectors, increasing densities can result in significant reductions to space heating requirements and, in addition, will reduce transportation energy demand minimizing the need for displacement.

5. Public transit

   This is the most energy-efficient form of movement but to be cost-effective it must serve relatively high density areas. Hence there is a great compatibility between higher density, mixed use development and the provision of improved public transit service serving transportation corridors and linking nodes of concentrated development.

The above represent some of the basic prerequisites which will allow for more efficient forms of development. These will contribute toward greater satisfaction and "livability", both real and perceived, with the built environment. However, an energy-efficient policy alone will not specifically generate a climatically protected or responsive environment. It will assist toward obtaining such an objective but also required will be further "landscape planning" and "micro-climatic strategies" acting in a carefully orchestrated fashion.

IV. Climate-responsive planning under cold conditions

While many of the basic principles for energy-efficient planning are more directly concerned with the macro-level and meso-level urban patterns, the tenets upon which landscape planning for climate-responsiveness are formulated tend to rely more heavily on micro-level considerations which deal with two prime issues:

1. Manipulation of the natural environment

   (e.g., through solar orientation, use of vegetation, site selection, siting of buildings, etc.)

2. Intervention by built form

   Here, examples would be through 'wind gates', fences and walls to deflect wind and snow, "roofed-over" projects (atrium and galleria type development), integrated bus shelters, arcade systems above sidewalks, courtyard dwelling designs providing their own micro-climatic protection, linked buildings, etc.

Meaningful policies and urban design strategies for the cold must not only take into account the local conditions of topography and climatic constraints but must also be acutely aware of the societal values, attitudes and potential user requirements. Climate, therefore, should be seen as a modifying factor under normal design settings. However, under extremely severe conditions, it may turn out to be a determining element.

If we wish to improve the environment on a year-round basis, providing emphasis to winter's demands, it will be necessary to identify those issues, problems and trends which are directly or indirectly capable of being influenced or manipulated through both private and public sector interventions. How can we improve our "living spaces" so that they are more closely in tune with personal desires and climatic demands? Perhaps an effort should be made which will provide an opportunity of reducing movement within the urban area by connecting places of work, residence and recreation more efficiently and by encouraging pedestrian displacement as an alternative to the automobile. This will infer the development of sheltered walkway systems not only in the central areas of Canadian cities but also within their residential neighbourhoods--linked with well designed, strategically located, heated bus shelters. Public open outdoor spaces will have to be conceived so that they offer some protection to users--by maximizing exposure to solar radiation and minimizing the effect of wind chill. Snow drifting and snow accumulation studies, sunlight studies (the measurement of the effects of presence or absence of sunlight on volumes, speeds and densities of pedestrian movements in public spaces), and wind studies can play a major role in this context. Public spaces which are not enclosed, and pedestrian networks, will have to be designed as continuous, attractive and functionally efficient, climate protected (to a certain extent) systems. The above elements are highly suggestive of a more compact urban form which must embody climate responsive principles on a year-round basis with emphasis on the winter season.

V. Conclusion

The livable winter city will have to address a wide spectrum of issues:[3]

1. Architecture and design

   Matters of colour, form, materials, textures, shapes and volumes will have to be more in keeping with the spirit of winter and its appreciation. Multipe-use spaces will have to be provided within the framework of interrelating the indoors and outdoors.

2. Visual environment

   Four-season open spaces and especially winter gardens, incorporating colourful features such as banners, flags, sculpture and other public art forms, should enhance the northern setting and evolve from it.

3. Attitudes and lifestyle

   A re-allocation of time should be studied in order to make better utilization of short daylight hours during midwinter. We must take advantage of the dramatic seasonal contrasts and consider recreation (cross-country skiing or ice skating) as a mode of travel.

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[3] Based on "THE LIVABLE WINTER CITY: HOW DO WE MAKE IT HAPPEN? "Summary Report of a Twin Cities Area Conference", January 19-21, 1979, Spring Hill Center, Wayzata, Minnesota.

4. Stimulation of neighbourhood action/civic activity

Carnivals, and winter celebrations of various types should promote the festive winter image throughout various neighbourhoods and, as well, within the central business district.

5. Improve the urban infrastructure

Better management of the urban infrastructure is urgently required. Transportation must be rendered more comfortable, convenient and accessible (heated bus shelters and reduced headways between buses can go a long way toward achieving such objectives during the coldest part of the season). More enclosed and semi-enclosed public spaces are needed with protective elements linking shops to parking garages, transit stations and other institutional functions.

6. Think winter

A radical readjustment will have to occur regarding our habit of thinking negatively about winter. Creative ways of inducing positive images shall have to be developed, e.g., attitude modification through education.

7. Do more with what we have

Solutions will have to be energy efficient and cost effective. More can be done to reuse and retrofit existing spaces and facilities. Through modifications, where appropriate, of many practices, ideas, policies and regulatory instruments which currently guide the ways in which the city is used and managed, we can incrementally improve what already exists. Innovative philosophies and approaches have to be encouraged.

8. Provide exterior public spaces conducive to winter activities

Cities require more fountains, water, trees, and places for social communication, for sitting, chatting, thinking, relaxing--which must embody a high standard of aesthetic quality in the design of their urban furnishings and landscape features. Especially in chilly climates, the presence of sunlight is a significant factor in explaining why some public urban spaces attract people and others repel them.

9. Inject the city with more lively centres

The city must be imbued with constructive energy which enhances civic life, pleasure and ease in shopping, business, and movement on foot, and which offers a high level of sensory delight and variety--while reducing stress. It needs lively, informal meeting places--both indoors and out. The integration of a diverse range of urban functions must be so devised that a richly woven tapestry of urbanity and urban identity will be the result.

10. More research is imperative

Post-occupancy evaluation of urban spaces, user analysis, participant observation, together with interview and questionnaire techniques, will be required if we are to find out which elements of the winter season are sought by urban dwellers and which are viewed as nuisances.

If "cities in the cold" are to be reshaped in more responsive ways, three levels of consideration must be addressed:

1. The Micro-level (house, dwelling cluster, building detail)

2. The Meso-level (city block, street, neighbourhood, precinct)

3. The Macro-level (district, town, metropolitan region)

If strategies can be simultaneously implemented at all three levels, we can expect a significant improvement in the way we experience our built environment. Some of these principles refer to elements such as favourable orientation of structures, wind protection, introduction of climate-modifying plant life, clustering of dwellings, mixed land use, urban infill, more rational distribution of jobs and places of residence, provision of more energy-efficient public transportation systems, and high quality sheltering techniques such as covered sidewalks, heated bus shelters, enclosed streets and underground development. Such concepts should be tested and evaluated with regard to cost-benefit considerations, on fairly elaborate scales.

Those working in the gap between social needs and environmental design responses - dealing with the interaction of people, society and the built environment - can more meaningfully contribute to development of our knowledge base affecting these two concerns. Higher standards of both urban planing and policy development must be achieved and more effective social research and planning undertaken. Updating, extending, and expanding the range of issues for which accurate predictions of use and behaviour can be made is a constant research priority.

One must work within the existing legislative frameworks of the municipalities and provinces - or central governments - if we are to anticipate realistic solutions. Two major techniques which the majority of cities utilize for implementing urban design and policy measures are the following:

1. the development of regulations which apply to new buildings

and

2. strategic use of the city's own public funds and outside grant money it is able to attract.

These methods are determining factors in managing urban growth and change. Zoning by-laws, development controls and official plan policies embodied in performance standards and development review criteria can set the

tone for what may or may not occur. It must be understood that they should be neither too specific nor too general if they are to achieve their intended effect, remain realistic and still respect the performance characteristics and economic viability of the development proposal, without imposing unnecessary restrictions.

Finally, it must be emphasized that winter should not be seen as an isolated part of the year but as part of the total cycle. The amelioration of harsh winter conditions will not constitute improvement unless the amenities and shortcomings of all the seasons are considered in relationship to one another. We must maximize the theatre of seasons and the man-made environment in order to create comfortable, desirable and efficient year-round cities.

THEY BROKE ALL THE RULES BUT THEY SUCCEEDED BEYOND ALL EXPECTATIONS

Marianne Stenbaek

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"They broke all the rules but they succeeded beyond all expectations" is one way to sum up the development of modern communications media in the Arctic. For much of the success is owed to individuals or organizations who just went ahead and set up communications media and in the process disregarded much of the conventional media wisdom about techniques and background expertise, and sometimes even the legal restrictions.

The Inuit have done a remarkable job with the new communications technologies, often doing the impossible and succeeding in setting up excellent television or other communications facilities in the Arctic. The Inuit have been very quick and very perceptive in understanding the possible impact of the new communications technologies on their way of life as well as the technologies' potential to help them maintain their own culture and language. The Inuit seem to have taken to the electronic medium so quickly because of necessity as well as certain cultural traits which are natural to the electronic media.

Necessity, because the Inuit simply had no alternatives but to welcome and use the electronic media. One reason is that there are almost no written documents in their language, only some government documents, some religious books and the occasional newspaper (this is particularly true in northern Canada, much less so in Alaska and Greenland). Another important reason is that there are no daily newspapers anywhere in the Arctic in the Inuit languages and only in the largest settlements are there either English or Danish newspapers, and even then usually a day or two late. Only the radio and television are capable of bringing news and information on a daily basis and in a language understood by the people. In a period of such rapid political and economic change with its attendant cultural change, up-to-date, daily, accessible information is a necessity for survival.

There are also certain cultural traits which have facilitated the Inuit's use of radio and television. The Inuit may well have been so percep-

tive both in understanding the nature of the electronic media in terms of impact and in the utilization of the media in the production of programs, because they belong to a highly visual and aural/oral culture. Traditionally, the Inuit's survival on the land as hunters depended on being able to see minute changes in the environment, and to hear the faintest movement by an animal. Their traditional community structure is also based on an oral/aural culture. Because of these cultural traits, Inuit have become excellent camerapersons and television producers who are very skilled in the use of television technologies.

The influence of their traditional culture on the 'eye' of an Inuit cameraperson may be discerned, for example, in many of the television programs produced by the Inuit Broadcasting Corporation or Tagramiut Nipingat (both from Canada). In these programs, it may be observed that the camera surveys the scene at a much slower, but also more careful, pace than a white camera-person would use. The camera will linger, picking up minute details that would be of interest to say, a hunter, but which white audiences sometimes find quite boring, (as has been my experience with students to whom I have shown Inuit-produced television programs because they are culturally not used to this slow pace). But the cameraperson's exceptional skill in picking up and utilizing visual detail cannot be ignored; it reflects a cultural value of a slower paced, more attentive life. (In contrast, it has been my experience that many Inuit find white television programs far too fast paced.)

The Inuit across the Arctic have been remarkable in what almost appears to be an unspoken agreement about the importance of the new communication media, although they have developed quite differently in the Inuit regions within Alaska, Canada, and Greenland. The Inuit Circumpolar Conference (ICC) which represents all the world's Inuit have, however, officially recognized the importance of communication by establishing a Communications Commission in 1980 with members from Alaska, Canada and Greenland. The Commission has been very active in helping set up exchanges of television programs between Inuit television corporations and in facilitating the technical and legal problems involved in trans-Arctic communications.

In Alaska, there have been lots of money (at least until the oil prices fell) and few regulations; in northern Canada, there have been government grants (since the Northern & Native Broadcast Program Act in 1984, a quite steady supply) and a fair number of regulations, but regulations which it has sometimes been possible to circumvent when necessary; in Greenland there have been a modest but steady supply of money, as the television service is a standard government budget item, and also many regulations, but they too have often been bent to accommodate the circumstances. The media structures in these three Inuit regions range from an American free-enterprise system to a Scandinavian social-democratic model in Greenland.

Yet within these different structures -- there has been and continues to be, a common purpose -- to use the new communication technologies to promote and preserve their Inuit heritage -- to keep their image, their picture alive.

In Alaska, the sky was the limit - quite literally. The Alaskan Native Claims Settlement Act (1971) gave the Inupiaq, Yupik and Indians almost a billion U.S. dollars in compensation and the oil boom in the 70's created a period of great wealth in Alaska. Financially, the Alaskans were therefore in

better shape than any other group in the Arctic. The Alaskans essentially were able to just go out and buy what they needed -- and that included everything from complete telephone companies; computers for most elementary and secondary schools; satellite television receiver dishes for most bush villages with more than 25 inhabitants; audio and video conference systems; expansion of the public radio and television network. To make it all work, Alaska bought a communications satellite, aptly named Aurora. Alaska is still the only State in the United States to own their own satellite. The sky really was the limit.

Innovative communications media were the results of this hardware. At the University of Alaska, Anchorage, the Learn/Alaska system was set up at the beginning of the 80's. This was an educational television and media facility-which, within three years, set up satellite down-link dishes in over 250 bush villages and a production facility that produced "Alaskan-content" educational programs. These television programs were geared very specifically to the Alaskan reality: cultural programs such as how to do Inupiaq drum dancing and practical programs on such topics as how to survive hypothermia if you fall into ice water, etc. The Learn/Alaska programs were mainly in English, but also in Inupiaq, Yupik and some Indian dialects.

Learn/Alaska also provided an astoundingly successful (as measured by the great increase in the number of users) audio and tele-conferencing facility that linked communities around Alaska for meetings, as well as for educational purposes. For example, it could link teachers at local community colleges or at the university campuses with students, be they in bush villages, fish camps, prisons or hospitals. The system has made it possible for some students to get a B.A. while living on the land, and facilitated the holding of meetings, etc.. The State of Alaska believed in this system so much that it was provided free of charge to its users, e.g. the ICC Communication Committee have used this system for meetings of its members in Barrow, Bethel, Anchorage, Rankin Inlet, Ottawa, Nuuk, Copenhagen, and New York at the same time; all of you who know the money and time involved in Arctic travel can appreciate the cost-effectiveness and time-effectiveness of this. Learn/Alaska did extremely well, but it was closed down when the oil crisis struck, but it is now being re-evaluated by the Alaskan legislature.

This was one of the most extended uses of the new communications media in Alaska, but local television stations also produce very interesting work. Such a station is the Northwest Arctic Television Centre in Kotzebue, Alaska. Their programs are done in conjunction with the local education board. They turn out in-depth news analysis and series of fine documentaries concerning many aspects of Inupiaq life. Programs are either in Inupiaq or in English. They produce excellent educational programs complete with teacher and student guides which teach young Inupiaq who are standing in the middle of two cultures, and who need to know both cultures, but seen through Inupiaq eyes. Northwest Arctic Television Centre also was able to set up direct live television coverage of the 1986 ICC General Assembly to Greenland by using the goodwill and technical expertise of several media organizations in Alaska, Canada and Greenland. It is exactly this kind of live direct broadcast from one Inuit group to another that reinforces the feelings of kinship and a common culture, thus using the media for very positive impact.

In Canada, the situation was and is very different from Alaska. There

has been no northern oil boom here so there has not been money nor any huge payments of compensations in land claims. Neither does Canada have the kind of deregulation that allows you to go out and buy your own satellite, it has a stricter regulatory structure which, however, was sometimes circumvented in the early days in order to get 'on the air'.

In regard to northern Canada, I will look at two specifically indigenous uses of communication technology. One is the community radio structure and the other one is the Inuit Broadcasting Corporation.

The Canadian Inuit community radios are a truly unique example of indigenous media. Canadian community radio started in the Arctic. Community radios could not be set up in southern Canada because of licence requirements and regulations (institutional radios such as university radio stations had been set up) however, community radios could be set up in the Arctic because the regulators did not know about them and when they eventually found out they were reasonable about it, often looking the other way.

The idea for an Inuit community radio came from Tagramiut Nipingat's (TNI) study The Northerners (1972) by Josepi Padlayat and Paul Lumsden. Steve Edwards, a Quebec government employee in Kuujjuaq, picked up the idea and provided the technology by buying several of the small transmitters used to steer radio airplanes and borrowing turntables, tape recorders and microphones from people in the community. He also manned the equipment and went on the air, together with Inuit from the community.

These makeshift community radio stations operated in several northern Quebec settlements for a few months. They transmitted on an AM frequency which was unstable and spilled over into airline frequencies, when complaints from airline pilots started to come in, they were stopped. But the idea had taken hold and TNI implemented new community radios in northern Quebec which broadcast in Inuktitut. The community radios were so popular that they quickly spread to other Inuit communities and later to many Indian reserves and other rural and remote areas.

Most Inuit villages and hamlets now have their own community radios, often housed in a room in the community or recreation hall. The technology is still exceptionally simple: a couple of cassette tape recorders, one or two record players, one or two telephones, and a microphone. It is transmitted by FM to the local inhabitants. It is usually completely indigenous in that it is operated by volunteers from the community who serve both as the on-the-air personalities and the technical operators. The community radio plays a lot of music, and also serves as an electronic town crier or notice board. It broadcasts many local messages, for example if you want your children to come home for dinner you call in and it will be announced over the radio that so-and-so should come home for dinner. Or it warns people of inclement weather; it gathers people for searches; it informs about hunting conditions. All kinds of local community news. And it is cheap, very often paid for by the bingo games they broadcast.

Indigenous television first came to the Canadian North with Tagramiut Nipingat (first as a federally-sponsored experiment via satellite and then continued on a pirated tape basis) and with the Inukshuk experiment (a satellited television experiment). After the experimental and 'tape' period, it

became a requirement to get a network licence in order to uplink on a satellite channel. The Inuit Tapirisat therefore recommended at its annual general meeting in 1980 that a new broadcasting network and system in northern Canada be created. This was the start of one of the most exciting television ventures in Canada. The Inuit Broadcasting Corporation (IBC) was set up in 1981 and in a few years has increased its broadcast time to the present 7½ hours of Inuktitut programming per week. It has expanded its network of local television studios to include Igloolik, Iqaluit, Baker Lake, Cambridge Bay and Rankin Inlet, and broadcasts to every Inuit community in the Canadian North except in the Western Arctic. An IBC program is also now shown on Greenlandic television every week and in turn broadcasts a Greenlandic program here.

Unlike the indigenous programs in Alaska, the IBC programs are entirely in Inuktitut and their aim is programs by Inuit for Inuit in Inuktitut. They have clearly demonstrated how television broadcasting can be used to foster native languages and culture. The programs they produce reflect Inuit values and have proved to be exceptionally popular with its audiences both in Canada and now in Greenland.

Greenland has had a long electronic media history. Their first radio programs in Greenlandic went on the air in 1926, due to the efforts of the telegraph operator, Holten Moller; later it became a radio corporation, Kalaalit Nunaata Radioa. This makes it one of the longest continuously running radio stations in Europe. Indeed, one story has it that it was the Radio Greenland programs in the Inuit language, which were heard by some Canadian Inuit on their transistor radios when they camped out in their camps in Northern Quebec, that originally gave them the impetus to press for programs in their own languages.

Peter Frederik Rosing, director of Kalaalit Nunaata Radioa, explains the immense importance the radio has had for the political, cultural and social development of modern Greenland:

> The radio has been able to gather this very scattered population together and give them the feeling of being one people. Because of the local patriotal feelings, there hadn't been the common feeling that we are in fact the same people with the same language and history, but only with some local small differences.
>
> But the new media, the radio with a little bit of luck, could be heard by almost everyone by the fifties and sixties. It gave the people the feeling "yes, we are the same people, we really are one people". It means much for the national identity that there is a 'gathering force'. The radio has been of immense importance in this respect.[1]

Television in Greenland started in 1 January 1970, on the private initiative of Ole Winstedt, a Danish businessman who sold television sets in Nuuk. It was set up as a cable network with members who had to pay a certain fee each year. The first programs were programs taped from the Danish television corporation, as Greenland is a part of the Danish Kingdom and Danish is the second language in Greenland. The programs were taped on a VCR in Denmark and sent up by plane to Greenland where they were broadcast locally, at first only in Nuuk. Within the next six years, 17 cable associations had sprung up in

various settlements, mainly on the West Coast.

The Danish programs were quite limited, for in those days Danish television only broadcast 3-4 hours a day (it still does not broadcast much more). There was also a great language problem because even the Danish programs were not all Danish but British, American, French, Italian, so Greenlanders got programs in all kinds of languages, but with Danish subtitles that many could not read. In fact, an audience survey from 1973 shows that many Greenlanders watched television with the sound turned off, but with the radio playing. So questions of language and culture were major problems.

Another major problem was that the taping was illegal. It was illegal to tape programs off the air and rebroadcast them, especially when the Danish television corporation had turned down an official request to share programs, and there was the strong possibility of copyright violations as the programs were rebroadcast for money because the various cable associations charged their subscribers. However, let it be said that although it was illegal on several counts - everyone co-operated in this venture and, although many bureaucrats as well as the Danish television corporation officially pretended not to know anything about it, the Danish television was in fact quite helpful behind the scenes.

Television subscriptions grew much faster than expected - by 1976 there were already 1600 subscribers in Nuuk, i.e. 20% of the population - which probably means television reached a little more than half the households.

All of these cable associations did their own scheduling, as each settlement would receive copies of tapes either from Denmark or the other cable associations. Some of the cable associations then started to do local programming - at the beginning very simple programs done with a portapak video camera. They were programs of sports events or local political events, maybe 15 minutes a week, every second week but this was the only programming in Greenland and in Greenlandic, and it was the beginning of indigenous television in Greenland. The producers, cameramen and the on-the-air personalities learned as they went along. Some large cable associations like the one in Nuuk employed a few Danish technicians and producers who were able to do local programs, and some Greenlanders had learned film and video techniques in Denmark. But the whole operation was very much learn-as-you-go and depended on private enterprise and people's goodwill (both in Denmark and Greenland).

As it became more and more apparent that this was a very powerful medium, people wanted programs in Greenlandic about Greenland. There was also the concern that it had to become legal. It was therefore decided that Greenland should have a centralized television corporation operated by Kalaalit Nunaata Radioa (KNR - Greenland Radio Corporation). Unlike previously where tapes were sent by plane to each cable association, the program would be broadcast from Nuuk to the settlements or cable association via the radio chain (the microwave relay system along the West Coast). Greenland is covered by the Intelsat satellites, but the price of satellite time was too steep for Greenland and the existing radio chain operated by Greenland Tele (the government agency responsible for communication technologies) was the economic solution. Only the very few settlements in the East Coast are still served by tapes and now also by satellite. The new television corporation also centralized production in Nuuk, although still with some local feeds.

On 1 November 1982, the first national television programs were broadcast from the newly-built studio in Nuuk. KNR-TV produces a wide variety of programs - children's programs, variety programs, political programs, dramas, news magazines and programs on family life. Like in both Alaska and Canada, they are highly successful and audience surveys indicate that there is a real need and desire for more Greenlandic programming.

I finally want to look at another technology that has not been examined in the context of the other two areas -- the influx of VCRs in Greenland. It is estimated by Tusarliivik (the former information office of the Home Rule Government), that the popularity of VCRs in Greenland is at one of the highest levels in Europe. Everywhere in Nuuk you can now see video rental stores and in a city of approximately 10,000 inhabitants the yearly rental spent on videos is now 5 million kroner or one million Canadian dollars (one hundred dollars per person). A great deal of concern has been expressed about the influence of video in Greenland by the Home Rule Government, and the school authorities.

In Greenland, there is a very strong censorship of films and television that publicly show violence. However, it is really not possible to censor the available violent videos which the strong censorship gives an extra appeal. It has therefore been conjectured by some Greenlandic media critics that in small settlements the introduction of VCRs may have resulted in as much violence amongst the younger generation as alcohol. This is a very surprising and not very well understood side effect of VCR technology. There is also the problem that the VCR shows one dominant culture, and that on the VCR there is little room for indigenous culture because there just isn't anything available yet. The images people see are always images and pictures from another place, another country.

In Greenland, the media were deemed to be of such importance that they were the first areas of jurisdiction (together with schools and churches) to the new Home Rule government in 1980. There is a direct proportional relationship between media control/economic power/political power. The more money you have - the more media programs and technologies you will have, and therefore the greater political power and control of the media, and vice versa. The greater the media control and independence, the greater the political independence, the greater the economic independence. An indigenous independent media is essential in the quest for economic, political and cultural independence and survival.

I called my paper -- "They broke all the rules but they succeeded beyond all expectations" -- and by that I don't mean that they necessarily broke the regulations but that individual people and organizations were willing to take chances and often to do the impossible.

The Inuit have shown that they are extremely well aware of how important the electronic media are to their survival. The electronic media can reinforce a sense of community; they can create common images and common experiences -- so important for cultural survival. They keep this picture alive.

Aqqaluk Lynge, filmmaker and broadcaster and now Cabinet Minister for Social Affairs in the Greenland Home Rule Government -- has in his own work tried to keep the image, the picture of the Inuit alive -- in a poem about the

condition of a resettled Greenlandic Inuk -- he writes:

When My Picture Disappears

Among the eternally travelling eskimos
there was no need to settle down
in one special place
But when the whites came and
found they could draw money from the ground
they built a mining town
and summoned the eternally travelling Inuit
before them
The old bearhunter
was among them
whom we met in the now-abandoned mining camp
- manpower made superfluous
- re-socialization a failure
- four fish/per day/per net
- pro persona (per person)
hunting conditions not ideal
They pushed us away from our life
Now they hunt us
beg and entreat us
to display our dead life
the life that has vanished
We now sit and remember
draw some lines
sew some patches
whittle in wood, carve in stone
and here create our identity
as in the days when it was our own

Soon I'll be used up
empty and worn
yes, even my teeth will have fallen out
and no one will chew for me
my fingers will be stiff
and my strength diminished
what will be left
when my picture disappears?[2]

What these new communication technologies in the North do -- is to try to make sure that their picture does not disappear.

Footnotes

1. Interview, Spring 1987

2. Poem translatted from Aqqaluk Lynge, Til Haeder og Aere - Tupigusullutik Angalapput. Copenhagen; Broedum, 1982.

WHAT IS NORTHERN TELECOMMUNICATIONS TECHNOLOGY?*

Michael Trevor Bravo

Acknowledgements

I wish to acknowledge the generous support of Telesat Canada, Darwin College, University of Cambridge and the Scott Polar Research Institute, without which I could not have come to this conference. Naturally, the views I express here are solely my own and do not necessarily reflect the views of any of my sponsors.

I would particularly like to thank Frank Duerden and ACUNS for inviting me to participate.

Introduction

Conversations about the future of the North sometimes assume the character of confident statements about the importance of technology, humbly expressed as the belief that our hopes lie with technology not against it. The technological paradigm has become increasingly powerful in the last twenty years. Symbolically and economically, the impact of technology on the North has been profound and all-pervasive. Attempts by the government to seek a handle with which to grasp and to control this technology have been hindered by the broad range of interests involved. The dilemma for policy-makers is to know which macro-questions are worth asking. For example, what sort of technology should Canada be trying to develop for the North? Where will it come from? Who will implement it and how? Who will be affected (or who won't)? These questions are tremendously difficult to answer. It is not surprising that the press has been unanimously unimpressed by recent efforts in the field of national science policy.[1]

I believe that one of the principal difficulties plaguing our policy attempts is that it is too easy to talk about science and technology without really knowing what is meant and without grasping the thoroughly interdisciplinary complexities involved. The problem is exacerbated when we speak of "northern science and technology". Conclusions to the effect that we need to develop a society oriented toward science and technology are, in my view, more damaging than useful.

Today, I wish to be slightly more specific in my generalities. I would like to pose the question, "what is northern communications technology?". Being a student of philosophy, I have the privilege of asking such a question without feeling obliged to proffer a universal answer. On the contrary, I will suggest that northern telecommunications technology is unique because of the potential clash between the political and socio-economic factors that exist in the North and those which are embodied in the communications technology (i.e. the nuts and bolts). The hardware, shaped, cast and packaged in

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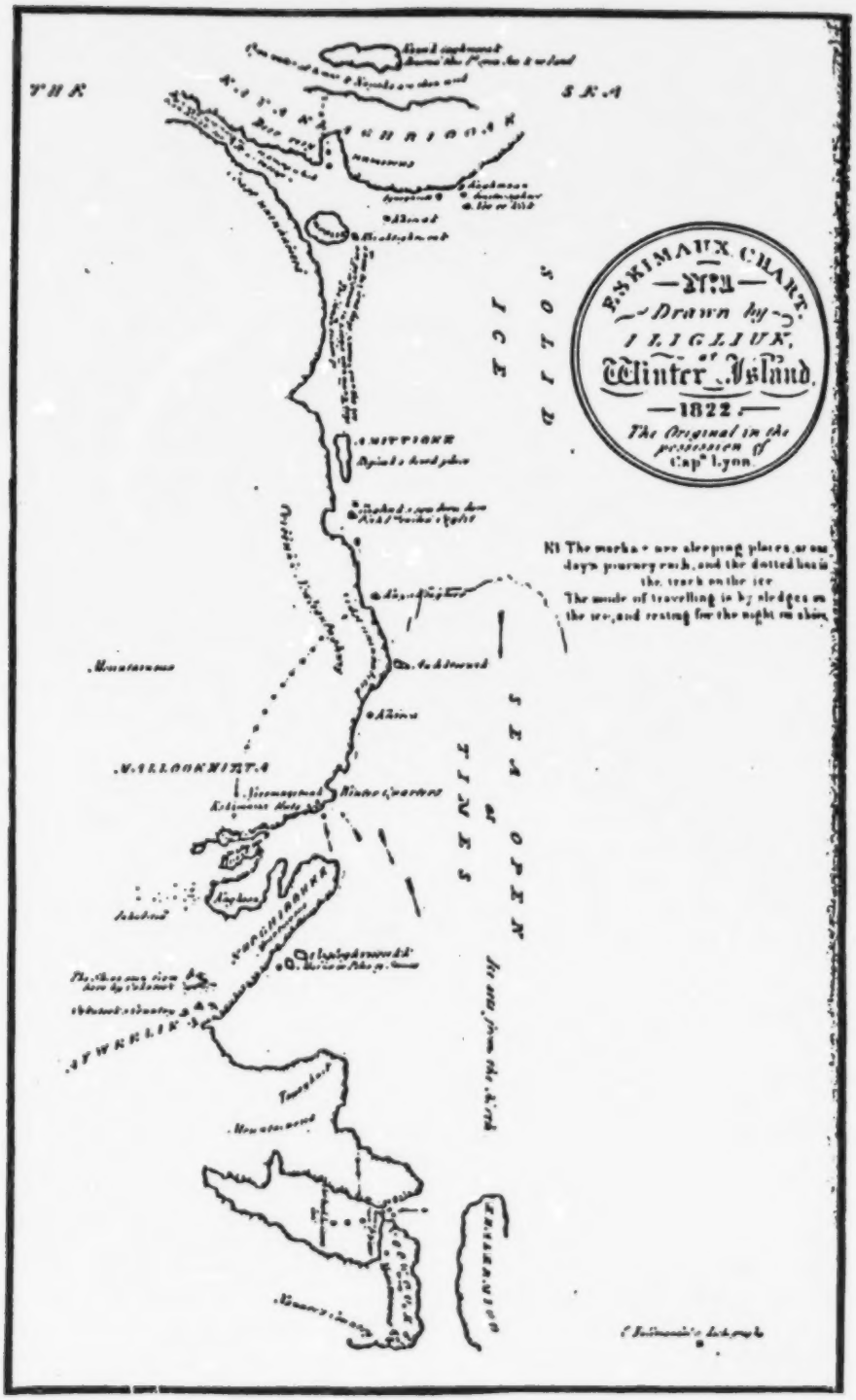
ESKIMAUX CHART
No 4
Drawn by
IIGLIUK
of
Winter Island
1822
The Original in the possession of
Capt Lyon
THE
SEA
ICE
SEA
OPEN
WATER
Mountains
Mountains
Mountains

Figure 1.

the South, is deterministic in the North where telecommunications take a diverse range of forms: the oral traditions of Native peoples, domestic communications by electromagnetic waves, political claims to sovereignty and strategic defence postures.

I should like to emphasize that telecommunications are not to be confused with "high-tech". Telecommunications, whose front end is derived from the Greek word tele, refers to communications over a long distance. This is a human activity that began long before people spoke of technology.

Esquimaux charts and Native interests

An historical example of telecommunications can be taken from Captain Parry's "Esquimaux Chart Number 3 (1822)", based on a map drawn by Ewerat of Amitioke, on the East coast of what is now called the Melville Peninsula (refer to Figure 1).[2] The detail along the coastal regions and the sparseness of information of the interior landmass suggest the importance of the coastline to Ewerat. Information about the location of an island, the supply of fish and walruses, the tides and the inscription that "Ewerat has never been along this coast in a canoe" tells us that the principal channel of telecommunications was probably over the water or ice. The distance between Winter Island and Amitioke is approximately twenty-seven days and gives real meaning to "telecommunications". The communication channel is marked out by a series of circles and dots, which refer to sleeping places. Not only does the map emphasize the prominence of travel for Ewerat; it actually defines the sense of scale for the entire map.

The Inuit, as I understand, have a great oral tradition. I would imagine that in the 1820s, telecommunications between Inuit in Amitioke and Igloolik would be inseparable from the strain of the sojourn, the reasons for the journey, the desire for personal contact and the immediacy of the situation. Without assuming a great knowledge of Inuit culture, I can imagine that the idea of extracting measured and controlled messages from this unique context of social relations would have been quite alien; and yet, this is precisely the process that began in 1822 when Captain Parry tried to "read" and to objectify Ewerat's map.[3]

Universal people, textbooks and industry

Telecommunications technology today is shaped by a network of powerful institutions for a global entertainment culture. Televisions, radios and telephones demand that all users pay the same lip-service to their rituals and restrictions. The effect of this, so well understood by the Native Peoples and the Québécois, is that people everywhere begin to laugh, to shout and to talk in the same way. If this is the case, **northern** telecommunications becomes a non-starter; it becomes redundant. The reader may be critical of southern programming, but may still demand to know how the technology itself demands conformity.

There are two answers. The more obvious answer is that the technology is necessary before any voice signal or picture can be received. This equipment is designed to be standard and used in specific ways. The world telecommunications market is enormous and is becoming increasingly homogeneous. Research and development in this industry is capital and knowledge-intensive.

It is dominated by several transnational-size companies like AT&T and Northern Telecom.[4] The scale of production transcends local needs and dwarfs any demand that could be called "northern". In other words, the communications hardware in the North is much like the hardware anywhere else and buys the same rewards.

Supporting the communications industry requires a great deal of specialized knowledge. The governments of all industrialized nations train electrical engineers with this knowledge at polytechnics and universities. Engineering pedagogy, a highly regulated business, moves to the rhythms of this international industry.[5] Contrary to popular myths, the emphasis in this **specialized** engineering pedagogy is on the **general** engineering skills, not the **specific** situations to which they might be applied. Communications theory is taught in terms of **the transfer functions of systems.** The desired form of the inputs and outputs is stipulated, not studied. This enables telecommunications engineers to apply their skills systematically in many places. In the world of engineering, adjusting or adapting the hardware to the local conditions of a project is usually considered to be a matter of experience or ingenuity, but not essence (refer to Figure 2).[6]

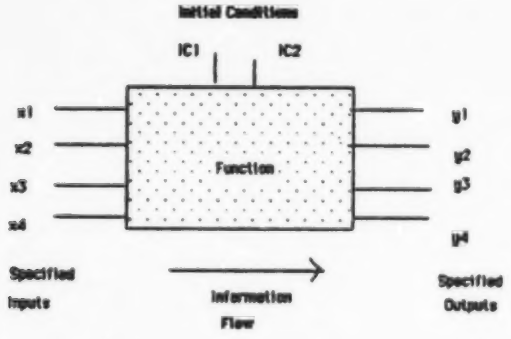

Figure 2. A System Diagram

Linguistics and messages

I hope to illustrate the more subtle reason that telecommunications technology demands our conformity by turning to the field of linguistics. In the early 20th century, Saussure made a distinction between two types of language: language as conversation or speech (la parole, la langue) and language as a strictly structured theoretical system of mutually defined symbols (le langage).[7] Speech includes the production of sound, tone, voice, the language, delivery, etc., whereas le langage is strictly the use of a set of symbols and their relations for constructing messages. The structure of a particular language is universal in its application; the speech or la parole is a unique series of events. Similarly, we can distinguish between a coded message and the conversation of which it is an integral part.

Searle and Austin explained the difference in terms of three different

levels of speech-acts: locutionary, illocutionary and the perlocutionary[8]. The locutionary refers to "the act of saying". It corresponds closely to the information contained in the coded message. The illocutionary -- "that which we do in saying" (e.g. imperative, subjunctive moods) and the perlocutionary -- "that which we do by saying" are equally important to a conversation and broaden our understanding of the relationship between the sender and the receiver. They reveal a level of meaning beneath the technical semantics of the information. They mar the distinction between form and content. Form becomes content, and content envelops form, each a product of the other. Communication regains the context of a discourse or conversation. No longer fixed by the technological form, the illusion of universality vanishes.

Shannon and information delivery

The question that I believe needs addressing at some length is the way and degree to which the technological structure of telecommunications systems shapes northern discourse.

In the nineteen forties Claude Shannon laid the foundations of information theory, the precursor to the structure of today's digital networks. Today, engineers and planners are striving to create a fully integrated digital communications network (ISDN).[9] **Shannon's achievement was to quantify the information in any message expressed in a structured language or code.** He quantified the average amount of information in a message, the capacity of a channel to accept information, and the maximum rate of transmission based on a given bandwidth and signal-to-noise ratio (SNR). One point is crucial. A digital telecommunications system presupposes that anything to be communicated can be stated in the form of a verbal, logical or symbolic language.

An event of communication between two people is complex to analyze. It involves the exchange of signs, symbols, gestures, moods, postures and much more. Of these, language and data are the only aspects that are already in the form of a generated code. Because they are symbols, they can be perfectly deconstructed, transmitted on an electromagnetic wave and reconstructed.[10] The myriad of more subtle links between participants are either distorted, lost or separated. (Consider why the business community finds tele-conferencing far less satisfactory than meeting in person.) Communications technologies tend to reduce a conversation to the exchange of language messages or representations in which people are designated "speakers" and "listeners". The **conversational content** is at once created by and reduced to the necessity of the **digital form.** This form is not neutral or value-free because it selects language (verbal and visual) to the exclusion of all else.[11] Divorced from the participants, the conversation becomes text and image.

The conceptions of a system and transfer functions lead to the concept of **information flow.** Our telecommunications systems assume and assure the priority of information. Its flow and reliability (truth-value of the data) have been tacitly accepted as the rational yardstick of the way in which we interact. The notion of an "information age" is not new, but is often misunderstood. I believe that it is one trademark of the much-prophecised information age that we so readily characterize our relationships, both personal and professional, in terms of the transfer of information.

An example: telephone conversations

The telephone systems says much about the new way of life for northerners. They continue to converse, but gone is the hardship of travelling twenty-seven days from Amitioke to Igloolik to send messages. Today the mode of telecommunications is radically changed for northerners, as are their difficulties. Communications are in one sense immediate. Telephone connections take only moments. One of Canada's outstanding achievements has been the extension of communication services to the North through sophisticated satellite transmission. A map of Telesat Canada northern earth stations (satellite receive equipment) shows the North as a **system of nodes** or communications stations (refer to Figure 3).[12] Each station services a community (e.g. telephones, teletype, television, radio). All of the community's traffic must pass through its node.

Consider the telephone service. Someone in Nanisivik decides to call a person in Pond Inlet, several hundred miles away. The necessity and character of the long journey has been obviated by the telephone. The caller merely lifts the handset, dials the person's coded number and waits for a reply. The speech is coded and transmitted. A telephone signal leaves Nanisivik on a 26,000 mile journey to a satellite above the Equator. The satellite transponder returns the signal to the Earth where it is received in Southern Ontario, just outside Toronto. The signal is sent by a microwave link to Ottawa, where the switching office for all northern telephone calls is located. The call is addressed to Pond Inlet and is re-transmitted through Southern Ontario, up to the satellite and down to Pond Inlet, where it is received and decoded.

Messages are sent and received. The rituals within communications are shaped by the system and become taken for granted. It would be worthwhile to study the changes in interpersonal relations between northerners since the advent of the telephone service. For example, the quality of a good telephone service is described by measures of efficiency, availability and access. If there is no loss of fidelity in the message or signal, and if the received signal does not reflect the presence of communications equipment, the system is said to be "transparent". What do we really mean by "transparent"?

Engineers speak of a spectrum budget. Bandwidth is limited and costs money. The guiding principle behind the design of the telephone link is that the message of the impersonal speaker should be clearly understood by the receiver. To a great extent, this defines the context of a conversation, removing it from the speakers. Much of the intonation and expression in the voice can be lost.

For example, the sound of any voice is changed by the telephone equipment because the traditional design of the Bell handset is based on using the minimum bandwidth to maximize "intelligibility"; a euphemism for efficiency of information transfer. When a caller speaks into the receiver, his or her voice is encoded as an electrical signal. Eighty per cent of the range of frequencies of the human voice are filtered out. The bandwidth of the signal (a measure of its ability to record high and low pitches) is limited to about 3.1KHz[13]. This covers a medium range of sounds and intelligence, based on the spectrum of typically spoken English or Indo-European languages. Presumably, one cannot do much singing over the telephone; never in harmony. Every song

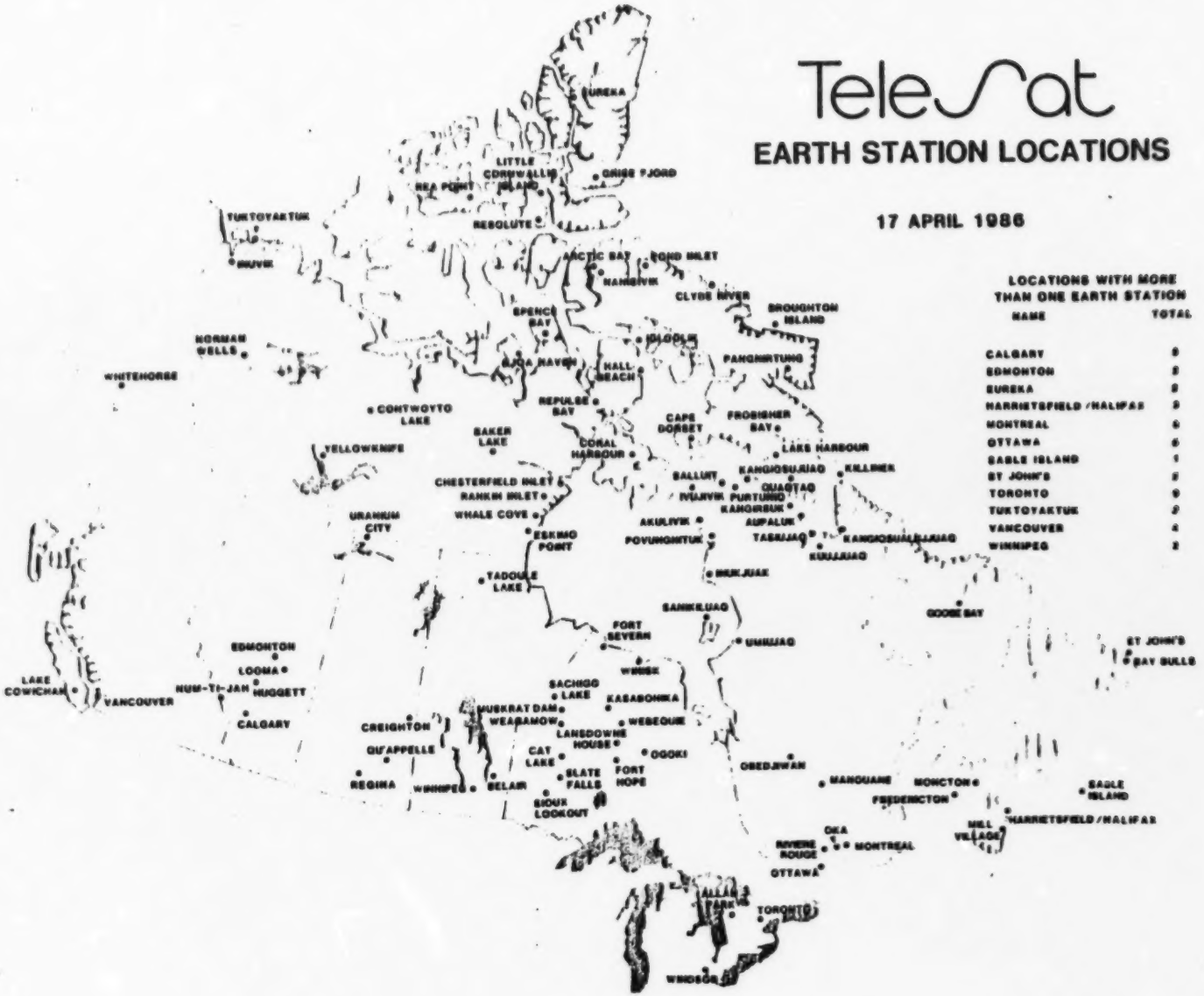
Telesat
EARTH STATION LOCATIONS
17 APRIL 1986
LOCATIONS WITH MORE THAN ONE EARTH STATION
NAME TOTAL
CALGARY 8
EDMONTON 8
EUREKA 8
HARRIETSFIELD /HALIFAX 8
MONTREAL 6
OTTAWA 6
SABLE ISLAND 1
ST JOHN'S 8
TORONTO 9
TUKTOYAKTUK 8
VANCOUVER 4
WINNIPEG 8
EUREKA
LITTLE CORNWALLIS ISLAND
GRISE FJORD
RESOLUTE
TUKTOYAKTUK
INUVIK
ARCTIC BAY
POND INLET
NANISIVIK
CLYDE RIVER
BROUGHTON ISLAND
SPENCE BAY
IGLOOLIK
PANGNIRTUNG
NORMAN WELLS
WHITEHORSE
BAIE NAVEN
HALL BEACH
REPULSE BAY
CONTWOYTO LAKE
CAPE DORSET
FROBISHER BAY
BAKER LAKE
CORAL HARBOUR
LAKE HARBOUR
YELLOWKNIFE
KANGIQSUJUAQ
KILLINEK
CHESTERFIELD INLET
RANKIN INLET
BALLUIT
IVUJIVIK
PUVIRNITUQ
QUAQTAQ
KANGIRSUK
AUPALUK
URANIUM CITY
WHALE COVE
AKULIVIK
TASIUJAQ
ESKIMO POINT
POVUNGNITUK
KANGIQSUJUAQ
KUUJJUAQ
TADOULE LAKE
INUKJUAK
SANIKILUAQ
GOOSE BAY
FORT SEVERN
UMIUJAQ
ST JOHN'S
BAY BULLS
WINISK
EDMONTON
LOOMA
SACHIGO LAKE
KASABONIKA
LAKE COWICHAN
VANCOUVER
NUM-TI-JAH
HUGGETT
MUSKRAT DAM
WEAGAMOW
WEBEQUIE
CALGARY
CREIGHTON
LANSDOWNE HOUSE
QU'APPELLE
CAT LAKE
OGOKI
OBEDJIWAN
REGINA
WINNIPEG
BELAIR
SLATE FALLS
FORT HOPE
MANOUANE
MONCTON
SABLE ISLAND
FREDERICTON
SIOUX LOOKOUT
HARRIETSFIELD /HALIFAX
HILL VILLAGE
OKA
RIVIERE ROUGE
MONTREAL
OTTAWA
ALLAN PARK
TORONTO
WINDSOR

Figure 3

is described and redescribed by the technical form, transparent only to those who have come to accept it unquestioningly.

The sounds of Inuktitut, which tend to be spoken at a higher range of frequencies than English, are particularly shaped by the frequency response (a design aspect) of the headset. This has in the past caused difficulties for the speakers in understanding each other and the equipment has been known to malfunction. One worthwhile engineering project would be to optimize the design of voice equipment to Inuit speech. Another could study the adaptation of Inuit voices to the headsets. There are many other possible projects.

Speaking up for northern telecommunications technology

Few people, I would think, can imagine reversing northern history. Satellite communications have brought major benefits to the North, for all people, including the Inuit. There is however much room for discussion of the nature of the services from the user's perspective. One can only speak of "northern telecommunications technology" by considering the unique needs and interests of northerners. For the time being, all telephone calls lead to Ottawa. Control of the switching lies in Ottawa. Two satellite hops are required for every northern telephone call.[14] In principle, a northern network should require only one satellite hop and the resulting delay is twice as long as it need be. We should not be surprised to learn that when this system of communications was introduced to the North in 1973, the sites were classified as "remote". This reflected the dominant view of Canadians at that time; that the North was peripheral to Canada, and still the last frontier to be claimed.

In twenty-five years, some visions of the North have begun to mature. Canadians are starting to realize that they have "real interests" in the North. This recognition needs to extend beyond the political immediacy of sovereignty and defence. The urgency of investing in the needs of the people of northern communities is fundamental to the identity that Canadians are trying to "defend". The technology only reflects the interests that make it. What sort of technology will our policies be seeking to make? Investment in the techniques of "northern telecommunications technology" will better serve the needs of all Canadians. It will help to build a stronger social, economic and technical infra-structure. But first, we must learn how to value the North.

We can speak of "northern telecommunications" in the context of Inuit culture. I think that a lot of work needs to be done in researching the needs of Inuit communities and the history of their adaptation to Western telecommunications technology. This understanding is necessary if communications policy for the North is to be sensitive to the needs of the Native Peoples.

Notes

1 Greg Barr (staff writer), The Ottawa Citizen, March 14, 1987

2 "Esquimaux Charts" in Voyages of Parry: (1821-23), London, 1824. p. 127.

[3] I have discussed the historical context of this and two similar maps in a thesis titled, "The British Search for a North-West Passage: Maps of Exploration (1818-1823)", currently held in the libraries of the Department of History and Philosophy of Science and the Scott Polar Research Institute, University of Cambridge.

[4] The Institute of Electrical and Electronic Engineers (IEEE), Spectrum

[5] The Institute of Electrical and Electronic Engineers (IEEE), spectrum

[6] I have underlined the words to indicate that they are part of the engineering jargon. They are "value-laden" and tend to reflect the approach to analysis of engineers and systems designers.

[7] Ferdinand de Saussure, "Cours de linguistique générale", 1916. This was delivered to his students in the form of course notes and was published posthumously.

[8] Cf. Paul Ricoeur, Hermeneutics and the Human Sciences, ed. J.P. Thompson, (Cambridge University Press), Cambridge, 1981, pp. 134-6, 168.

[9] Claude Shannon, "Information Theory" in Encyclopedia Britannica, 1969 edition, p. 248. ISDN is an abbreviation for the Integrated Digital Standards Network. This is a system with a set of common technical standards for voice, video and data signals that would allow them to share the same circuits. The common standards are digitally based. Some ISDN systems are currently being developed and tested.

[10] By "language", I am referring to a structured system of words, defined in terms of narrow words, as given in a dictionary, for example. This is what the French refer to as "la langue" as opposed to "le langage", which includes the broader complexities of language use.

[11] See note 6.

[12] "Telesat Earth Station Locations", published internally by Telesat Canada, Ottawa, Canada. April, 1986.

[13] R.L. Freeman, Telecommunication Transmission Handbook, John Wiley & Sons, 1975, p. 26, fig. 1.10.

[14] "A Technical Description", published internally at Telesat Canada, 1974.

MAPPING WILDLIFE: DOES IT WORK, IS IT WORTH IT?

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I was invited to talk about wildlife mapping in the Northwest Territories, and to that end I plan to describe what we do and how we do it. But I would like to carry the talk a little further in an effort to address two questions: Does wildlife mapping work and is it worthwhile?

What is a map? From my perspective a map is graphic information. It is a scientific tool with much utility for many kinds of research and management applications. Man has only limited abilities to observe directly those phenomena that interest him. Essentially, maps are used to represent the accumulation of data and the designing of their display in order to make available or communicate the spatial information in the most accurate and efficient manner possible.

As a wildlife manager, and more specifically a wildlife habitat manager, my interest obviously rests with the development of maps designed to accurately depict the spatial relationships of wildlife populations to each other and to their environment. I use maps for a variety of reasons.

1. A primary role of the wildlife manager is to assess habitat quality and quantity to improve our ability to determine needs of wildlife in a geographical context, and to manage those needs effectively. In the Northwest Territories, biologists are just completing an intensive evaluation of wood bison habitat on the west shore of Great Slave Lake in order to delineate important cover types. This information is being used in the formulation of a management plan.

2. I would like to extend this concept a little further to describe another application of maps to species specific management, but this time on an extensive scale, as opposed to intensive scale. Depending on one's perspective, wildfire plays an important role in the maintenance or destruction of wildlife habitat. In this case, biologists combined fire maps and barren-ground caribou distribution to evaluate the impacts of fire on the quantity and location of winter habitat, which is also important to the traditional users dependent on the caribou for food.

3. Maps are used to plot strata to facilitate the implementation of efficient sampling techniques, including census route selection. Often biologists first fly reconnaissance or "spaghetti surveys" to locate the animals, delineate the strata and design transects. This technique is employed on the calving grounds of the barren-ground caribou.

Population estimates are then derived and applied in the development of management strategies. On the calving grounds of the Beverly and Kaminuriak caribou, these data are also used to implement the caribou protection measures. This program is designed to eliminate or minimize human-caribou interaction during the critical calving and post-calving period. Therefore, the data displayed on wildlife maps can be employed to serve more than one purpose.

4. In southern Canada, maps are used to enhance evaluations for land purchase. This use is not directly relevant in the N.W.T.; however, maps can be used to demonstrate use and implied ownership and are important in the land claims process, as we will learn from Dr. Riewe (see article in this volume). Too, they can be used to assist resource managers in their efforts to determine the value of lands in the land use planning forum. In this case, wildlife habitat is one of many variables in the equations. The application of values-at-risk programs is without doubt a classic example. We are presently addressing the values-at-risk concept and hope to employ it to enhance our wildfire management programs. I feel such a program could be effectively employed to manage wetlands as well.

5. Maps can be employed to estimate needs and to select sites for habitat manipulation. Again, southern Canada is the recipient of most of this work. However, in cooperation with the Fort Smith Hunters and Trappers Association and Ducks Unlimited, we have engaged in a bioengineering study to examine the feasibility of constructing dams to enhance muskrat and waterfowl habitat in the southwestern N.W.T.

6. Environmental impact assessment and land use planning are now common buzz words in the Northwest Territories. Both play important roles in the daily lives of all who live and work there; and given the significance of wildlife, wildlife management plays an important role in every assessment and planning process. I do not wish to leave you with the impression that we (and by we I mean government, industry and the public) have employed mapping techniques effectively to meet the goals and objectives of any assessment or planning process. But we have at least attempted to use them. There is considerable room for improvement in the assessment process and land use planning is a relatively new concept in the North. In this context, maps can be employed to predict the future appearance of an area, to establish a historical base or a standard for future comparison. Such a program requires foresight, money, expertise, technology, and commitment.

7. Last but not least, maps are used for education. For example, our Safety in Bear Country Education Program emphasizes to people living and working in bear country the need to understand the behavior and ecology of bears. An important aspect of this education and training program describes how bears relate to the spatial components of their environment: where they go at different times of the year to find food and shelter. If we can identify preferred feeding habitat, then we can depict this habitat on a map and through our training program hope that people avoid these areas during periods when they are occupied by bears.

Given that I, as a wildlife manager, employ maps for a variety of different reasons, I would like to describe some of the techniques employed to generate maps and to show you some of the products. As I outline some of the techniques, please keep in mind that a map is an instrument for recording, calculating, displaying, analyzing, and understanding the interrelation of things in a spatial context. I like to refer to wildlife biologists as second or third generation mappers. We do not create our own maps, we modify existing maps to meet our needs. For simple delineation problems (for example, the caribou protection measures), we employ 1:250,000 or 1:500,000 scale topographic maps to plot the distribution of caribou. This kind of program is completed first by employing a low-level aerial reconnaissance flight to find

the calving caribou. Strata are then delineated and a low-level photo reconnaissance plane is dispatched to photograph the animals. I should note that this technique has only recently been employed with considerable improvement in the accuracy of the counts. The photographs are then interpreted, the animals counted, the calving ground delineated and the population estimated. The boundary of the calving ground is then employed to implement the caribou protection measures.

This technique allows us to map the distribution of caribou only during a very short time in their annual life cycle. What about the rest of the year? Do caribou of one herd mix and breed with caribou of another herd? Exactly how far do polar bears range during the course of a year, and to what extent do they use different habitat types? What is the extent of the annual movements of wolves? Do they follow caribou throughout the year or do they supplement their diet with other species at specific times? These and many other questions confront the modern wildlife manager. In order to begin to address these questions, we are now employing low-level radio telemetry and satellite telemetry. The temporal distribution of a number of species is now being tracked and mapped in an effort to enhance our ability to manage. These are examples of extensive mapping programs.

Too, we undertake intensive mapping programs which include aerial and ground components. Our wood bison program includes such a study. In order to manage within the limits of sustainable yield, we must determine with reasonable accuracy the ability of the habitat to support wood bison. One of our habitat management biologists tackled this problem with the aid of a remote sensing program. He employed a supervised classification, which required ground truthed habitat data, and the use of distribution data collected from low-level fixed-wing aerial surveys. By integrating this data with Landsat data, he delineated the available useful habitat for wood bison, and calculated what we believe to be an accurate estimate of carrying capacity.

In summary, we employ ground observations, low-level survey flights, low-level aerial photography, low-level and satellite telemetry, and remotely sensed data to create maps describing wildlife distribution and abundance in relation to each other and to their habitat. But these techniques are not without problems.

I do not plan to dwell extensively on the problems associated with mapping programs, however they are important and do merit attention. Weather can be an unpredictable and costly problem, especially if the mapping program requires the deployment of survey crews and expensive aircraft. The Northwest Territories encompass more than three million square kilometres of Canada's domain and one hundred and thirty two thousand square kilometres of freshwater bodies. This represents an area which approximates the size of India and 9% of the world's freshwater resources. Distance, and hence budgets and logistics, present what often appears to be a formidable obstacle.

Now to the questions at hand. Does mapping work and is it worthwhile? At the risk of being accused of sitting on the fence, my response is I think so. I take this position because I feel we are at the crossroads with this and many other issues confronting northern wildlife managers right now. With respect to the mapping questions, I believe we have the tools, the know-how,

and the will. I do not believe we have put all the pieces together. I do not believe we are putting enough effort into the "big picture".

On that note I want to make reference to the Mackenzie Valley syndrome. It was identified by Stan Rowe from the University of Saskatchewan a number of years ago. The Mackenzie Valley syndrome resulted from a massive invasion of the area by researchers and managers in an effort to describe the environment, in order to enhance decisions respecting the exploration and development of the oil and gas reserves of the Valley and the adjacent Beaufort Sea. The result was a plethora of disconnected bits of information, without a conceptual framework to give them meaning. Please do not misinterpret what I am saying. I know many of you worked in the Valley on various projects. The quality of a significant portion of that work is, without question, first class. But in the context of the "big picture", it can be equated to a sea of confusion, the likes of which I do not think, and I hope we will not, see again.

In recent years, researchers and managers have begun to look at this problem. The fundamental question, therefore, is how do we eliminate the Mackenzie Valley syndrome? Under the auspices of early sectoral research and management in government, industry, and the universities, we aimed to effectively describe and manage those parts and relationships important to us and critical to the maintenance of our chunk of the environment. Therefore, the environment was studied and mapped according to specific, often isolated, fields of interest. This has been coined the unidisciplinary approach. With increased knowledge of the environment, and recurring battles in the assessment and planning forums, we began to see that there were other points of view and a large volume of multi-disciplinary data relevant to the questions at hand. Hence, the birth of the multi-disciplinary approach to management. If I attempted to incorporate all of the multi-disciplinary data available for many areas, I would wind up with a map completely blacked out with data. There is obviously little utility in pursuing this approach because it would not meet the needs of the decision-maker. Therefore, more effort was devoted to refining, relating, priorizing, integrating, and presenting the data for interpretation by a nervous group of decision-makers responsible to the politicians who commissioned the work and the public who demanded the work be done to improve archaic and often biased decision-making processes.

An underlying principle of the interdisciplinarian is that everything in this world is connected to everything else. Historically, I think many multidisciplinarians converted as soon as they realized that an interdisciplinary approach was required if they were to effectively deal with this decision-making boondoggle. Hence, the "big picture" supporters and the concept of interdisciplinary management was given credibility. Has it reached fruition? I am disappointed to say that from a wildlife manager's perspective, it has not.

I can cite references to a number of computerized data bases which contain extensive and intensive data sets describing the geology, soils, terrain, vegetation, and aquatic resources of an area. Unfortunately, the wildlife resources, often an afterthought, are described elsewhere, as an anecdote, or not at all. In the N.W.T. this severely restricts the usefulness of these data bases because of the high value placed on wildlife by northerners and in

fact by all Canadians.

I know of a number of university researchers and some government managers who are addressing this problem. In association with Drs. Lewis, Cameron, and McQueen of York University, we are attempting to alleviate this bottleneck through the development of techniques designed to facilitate the integration of wildlife data with the other ecological components which are used to describe the environment in which wildlife live. Preliminary results suggest that it can be done, and that the existing (and I might add, underutilized) multi-million dollar data bases out there can be tapped and applied.

I do not wish to undermine the significance of unidisciplinary data collection. It is important and will continue. I simply believe, perhaps naively so, that if collected according to a standard set of guidelines, it can be used to address the "big picture" questions and issues.

This brings me to the next stage in this iterative, rather dynamic field, geographical information systems. Professors Banting and Duerden will speak about the "GIS", so I do not plan to spend a great deal of time on it. Simply put, a "GIS" can be employed to store, retrieve, recombine, restructure, analyze and display a wide variety of spatial information. I believe that the "GIS" is a tool which, if employed correctly, could assist the northern resource manager in his or her efforts to solve many of the problems we face today. In order to accomplish this task, we must first ask the right questions, develop the most appropriate goals and objectives, and employ a sound support infrastructure. In essence we must.

1. Conceptualize the environment as a hierarchy of biogeographical systems at various scales.

2. Recognize that these systems are in a constant state of flux and constantly adjusting to one another. Therefore, they are dynamic.

3. Collect data in an integrated way. Experts from different fields must recognize the same hierarchical system and must agree on priorities and techniques.

4. The experts must work together.

5. They must work according to a framework.

6. And last, but not least, the data bases must contain the raw data to facilitate re-evaluation, re-manipulation, and the generation of new results for new questions. It is extremely difficult, if not impossible, to address previously unasked questions if the data have already been manipulated and summarized for other reasons.

In Yellowknife, we are presently pursuing two options in an effort to modernize our approach to mapping. As part of the federal Technology Enhancement Transfer Program, which is sponsored by the Canada Centre for Remote Sensing in Ottawa, we will be the recipients of an image analysis system this fall. I realize that this sounds like a small acquisition to many of you, but in the Northwest Territories, where we constantly find ourselves borrowing time at facilities in the south, this is a major event. I am anticipating

that we will make significant strides in our ability to map the diversity of resources found in the N.W.T. In addition, we are presently evaluating our requirements for a "GIS".

Before I conclude, I would like to pursue a tangential line of thought, partly based on emotion and partly based on experience. I spend most of my time dealing with the environment in the context of wildlife management. However, I often think that many of our problems (and those working in other fields please correct me if I am wrong) result from man himself. I refer you to Bhopal, Chernobyl, Three Mile Island, acid rain, Love Canal, and many more disasters. It seems that the magnitude and the complexity of the problems are increasing and our ability to cope with them and those of the environment is decreasing. For example, we have only recently begun to model for incremental impacts, never mind deal with them in planning and assessment forums. Perhaps our drive to improve our ability to map and interpret information will help us answer some of these dangerous questions. But my primary hope is that in some small way it assists man to manage himself. If man learns to manage himself better, he will better manage the environment from which he derives his existence.

GEOGRAPHIC INFORMATION SYSTEMS AND THEIR APPLICATION TO THE YUKON LAND CLAIM

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I. Land claims and land use mapping

For the past five years, the Geography Department at Ryerson has been involved in examining the land use potential of land claim areas in the Yukon. Funded initially by the Donner Canadian Foundation, atlases of current and potential land-based activities have been prepared for the Council of Yukon Indians, from a multitude of secondary data sources, as well as from surveys in the field (Fig. 1).

Currently underway is the mapping of the land claim of the Teslin Band in the Southern Yukon. For this area the Department's Synercom Geographic Information System is being used in order to assist the Band with various land selection scenarios. The system allows us to examine each of the themes of the land use/land cover survey as discrete coverages of the area, or in combination with one another. Once the data base is fully in place, non-graphic records associated with the mapped features can be incorporated into the process of examining characteristics of the selected claim configurations.

II. Land selections and land use information

Information about land is basic to the land claims process. Essentially it:

1) assists in the primary identification of areas of claim interest
2) enables native groups to build scenarios associated with different selection configurations, and
3) provides a mechanism for managing the land after claims have been settled.

The complexity of dealing with land use information is reinforced when one considers that land selection has been an iterative process; land claim boundaries have been changed in the course of discussions, as the two sides - Government and Native - negotiate. The ability to rapidly update maps, to transmit them to native groups, and to draw inferences from emerging situations as they arise is not readily accomplished without the benefits of Geographic Information Systems.

III. A G.I.S. is essentially comprised of three components,
- a data base management system,
- capability for spatial analysis, and
- graphic capabilities for input and output.

The Data Base Management System is the key to the representation of the geography of the features of interest, and therefore provides the utility of the system. Under its organization, mapped data are entered into computer storage as two data sets:
- the coordinates of the features: points lines and areas of interest, comprising Graphic Records;
- the other characteristics or attributes of these features, such as forest tract or trapline records, forming Non-Graphic Records.

The data base must be set up to accurately represent the phenomena, yet permit rapid processing of both graphic and non-graphic components, which may become rather large data sets, given the complexity of land use and land cover mapping units, and the extensive lists of attributes compiled for many areas. Another reason that G.I.S. data sets are large is because information about the relationships between spatial phenomena must also be stored. These include documentation of the sequences of line segments comprising a linear feature, i.e. a road, and the adjacency of area features such as polygons. This need for large data sets has inhibited the widespread adoption of microcomputers to G.I.S.

The Spatial Analysis component of a G.I.S. can involve software for simple tasks such as selective display, for instance an ability to produce an image of specified features and/or specific areas, without the clutter of unnecessary background information which is commonly found on base maps. Another common task is that of calculating geometric measures of the dimensions of spatial features, such as distances, directions, perimeters, areas, densities, volumes, etc. Such calculations are often not individually difficult to perform "by hand", using a planimeter or other devices, but can be tedious if repetitions are required, and if many repetitions are involved the task is often not carried out. These measurements are readily accomplished in systems with appropriate geographical referencing built into the data base, and results are readily incorporated into further analytical and modelling functions of the system.

More complex tasks for pattern evaluation such as nearest neighbour

analysis, and polygon assignment (proximal, Theissen, etc.) are commonly available in a G.I.S. as are routines for point in polygon enquiry, radial searching, buffer calculation, corridor definition, and polygon overlay. Spatial modelling, involving location/allocation routines, trend surfaces, digital terrain models etc. are similarly available for more sophisticated endeavours.

Data Input is usually accomplished via specialized equipment such as digitizing tables or scanners, but nongraphic data relies on more commonly available tent-entry terminals. As G.I.S. technology becomes more widespread, opportunities for interchange of graphic and nongraphic files will reduce the need for labour-intensive data entry. G.I.S. output can be "soft-copy", with maps and data interactively displayed as screen images or plotters can be used to produce larger paper or mylar copies.

The merits of G.I.S. lie not only in the customizing of data output but in the ability to deal interactively with large quantities of spatial data, and through manipulation procedures to provide new information regarding arrangements of landscape features and the patterns of their attributes.

IV. Data needs and applications

Initially, the information needed is that which will support identification of potential land claim areas. Basic descriptive data are required in order to provide an inventory of the status of the land with respect to each of a multitude of land cover and land use dimensions. This information should document not only physical and biological attributes of the environment, but also expression of social, economic and cultural processes.

Specifically, information serving as input to the land selection process should ideally relate to the location and signficant characteristics of:

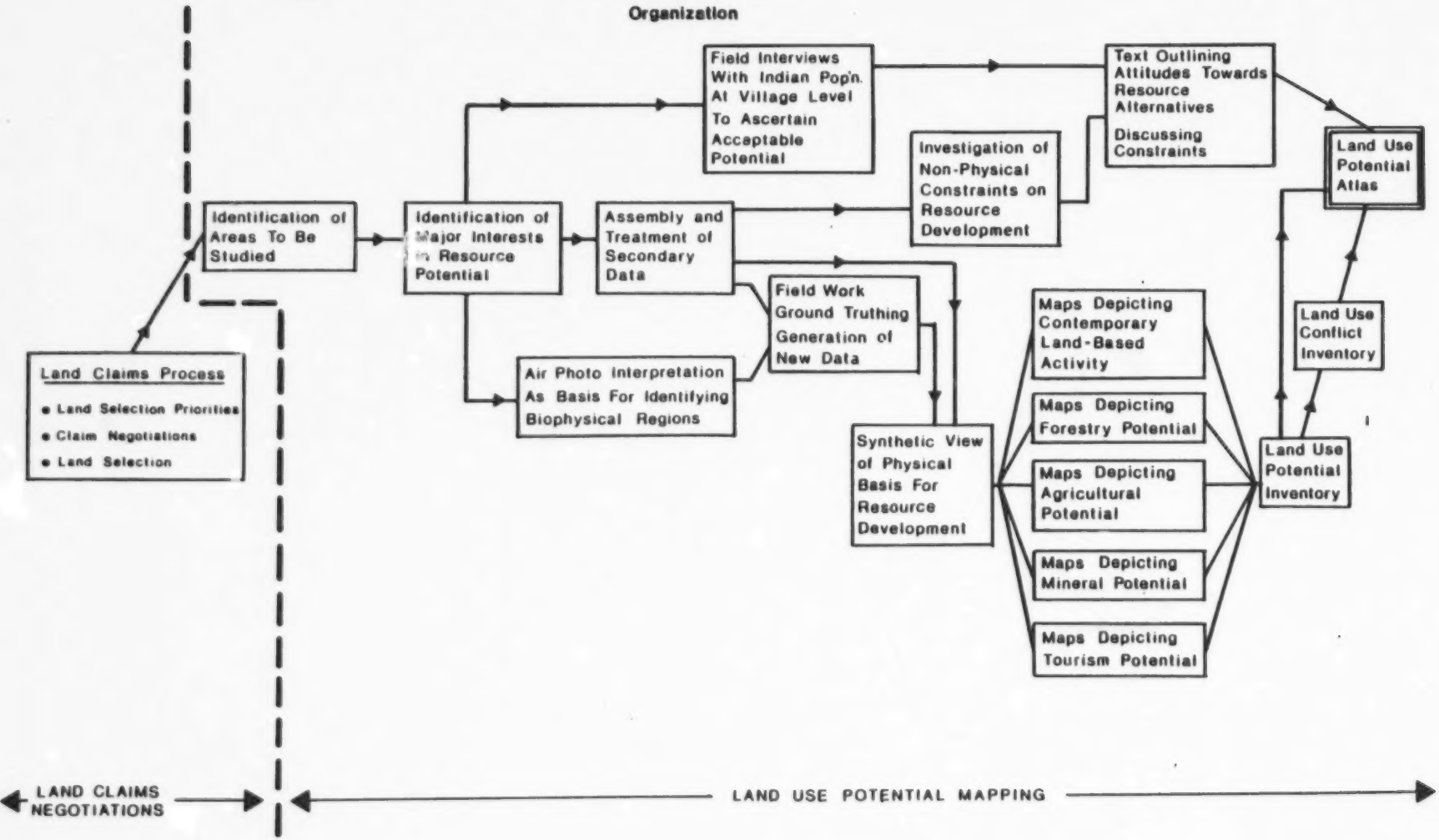
1. current land cover:
   - the nature and extent of biophysical features - related to hydrology, physiography, flora and fauna

2. land use:
   - traditional pursuits including hunting, fishing and trapping activities,
   - agriculture/horticulture/harvesting
   - tourism facilities,
   - mining enterprises,
   - forestry activities,
   - jurisdictional constraints

3. the potential opportunities for future activities under each of these land use categories, with due consideration for the need for conservation.

Subsequently alternative claim configurations and strategies can be examined and evaluated. Scenario-building procedures can be developed, and native groups permitted to assess the opportunities and constraints of various land selections.

Figure 1 Yukon Mapping Project Organization


Land Claims Process
• Land Selection Priorities
• Claim Negotiations
• Land Selection
Identification of Areas To Be Studied
Identification of Major Interests in Resource Potential
Field Interviews With Indian Pop'n. At Village Level To Ascertain Acceptable Potential
Assembly and Treatment of Secondary Data
Air Photo Interpretation As Basis For Identifying Biophysical Regions
Field Work Ground Truthing Generation of New Data
Investigation of Non-Physical Constraints on Resource Development
Text Outlining Attitudes Towards Resource Alternatives
Discussing Constraints
Synthetic View of Physical Basis For Resource Development
Maps Depicting Contemporary Land-Based Activity
Maps Depicting Forestry Potential
Maps Depicting Agricultural Potential
Maps Depicting Mineral Potential
Maps Depicting Tourism Potential
Land Use Potential Inventory
Land Use Conflict Inventory
Land Use Potential Atlas
LAND CLAIMS NEGOTIATIONS
LAND USE POTENTIAL MAPPING

Once the claim negotiations have been concluded, the inventory of land cover and current and potential land use information, as well as the various scenarios developed in the evaluation stage will serve as a basis for future land management programs. Geographic information in the appropriate form will therefore not only serve the immediate needs of the claim negotiation process but will continue to have utility in meeting the long-term needs for spatial data.

LAND USE MAPPING AND REGIONAL VARIATIONS WITHIN NUNAVUT

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and

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Since time immemorial the Inuit and their ancestors have occupied over 3 million km^2 of land and sea in the Northwest Territories. Due to the decision of the Supreme Court of Canada in the Calder case in 1973, the Federal Government announced its willingness to settle aboriginal land claims. In response to this announcement the Inuit Tapirisat of Canada (I.T.C.) launched their land claim in the Nunavut region in 1976. In 1982 the Tungavik Federation of Nunavut (T.F.N.) was created by I.T.C. to carry on with land claims negotiations with the Federal Government. In 1985 I was seconded from the University of Manitoba by T.F.N. to co-ordinate the Land Identification Project. This mapping project was intended to assist the Inuit with the identification of their lands which they will retain after the settlement of the claim, as well as to assist the communities with their future land use planning.

There are two major sources of published land use information for the Nunavut region. The I.T.C. Land Use and Occupancy Project was published in 1976 under the direction of Milton Freeman. The Northern Land Use Information Series (LUIS) was published by the Departments of Indian and Northern Affairs and Environment between 1972 and 1984. With regard to the current negotiations there are certain limitations with both of these earlier sources. The I.T.C. maps demonstrated beyond a doubt which areas the Inuit have traditionally and currently occupied in the Northwest Territories. These maps, however, are too small a scale (1:2,000,000) for the present land identification process, they also lack any indication of the intensity of land use, and they do not show wildlife areas nor competing land uses within Nunavut. The LUIS maps on the other hand are too large a scale (1:250,000), which requires more than 300 map sheets to cover Nunavut. These maps are also difficult to interpret because of the layering of data and most importantly, the Inuit land use data is incomplete.

We have used the Freeman study and the LUIS maps as the primary sources for our Nunavut Atlas but we have made a few changes which we hope will alleviate the limitations of the former mapping projects. Our Nunavut Atlas is at

a scale of 1:500,000 which reduces the number of maps to 65. Our Atlas depicts the past and present Inuit land use, wildlife distribution and abundance, third party interest and present and proposed conservation sites on three coloured acetate overlays.

In order to update current land use and to determine the intensity of land use, my field workers and I went into all the Nunavut communities and had the elders and senior hunters make additions and corrections to our maps. We asked them specifically to mark their campsites, fishing sites, major travel routes, archaeological sites, and to indicate how often they used each area. This information was then transferred to our Inuit land use overlays. The areas which are used every year are shown as high intensity use areas. Areas which were used traditionally but have not been frequented during the past 20 years are depicted as low intensity areas.

Rather than go into the details of our mapping project, I will discuss some of the variations within the Nunavut Region which will give you a better appreciation of why the Inuit are negotiating to retain as much land as possible.

Let us examine the land use of three Nunavut communities: Eskimo Point, which is the most southerly Inuit community on the west coast of Hudson Bay, Coppermine, which is the most westerly Nunavut community on the arctic coast and Grise Fiord, which is the most northerly community in Canada. Eskimo Point, situated on the edge of the Hudson Bay lowlands, has a population of 1300 persons of whom about 95% are Inuit. Approximately 350 Inuit are registered as hunters. This physiographic region is aptly named the Hudson Bay Lowlands, the topography is composed of very flat peatlands dissected by old beach ridges and eskers. These lowlands are carpeted by mosses, lichens, sedges, grasses and dwarf shrubs which are watered by 28 cm of precipitation annually. The tree-line begins 120 km west of town. The sea freezes up in November and breaks up in July. The ice disappears from Hudson Bay each summer - there is no multi-year ice in the Bay. During the winter and spring the highly productive floe edge is only 5 to 15 km from town. Since Eskimo Point is about 650 km south of the Arctic Circle there is still about 4 to 5 hours of daylight in December, and the sun does set below the horizon for a few hours even in June.

The word Keewatin is an Indian name which means the North Wind - never has a place name had more significance. During 18 years of working in the Arctic, I have never experienced an area where there are such bitterly cold winds. The north wind seems to blow constantly and with a vengeance. During the winter, travel on the land is always hazardous due to the temperatures which hover around -35°C and dip down to -50°C. After spending years in the High Arctic I was amazed to hear a visiting hunter from Grise Fiord complain about the unbearable cold in Eskimo Point.

Despite the flat topography, travel in the summer is also difficult due to the marshy landscape that attempts to swallow up men and machines and due to the hordes of biting flies. But the hunters must travel to secure their game - and travel they do, winter and summer.

Eskimo Point's total hunting range, which has been used during the last couple of decades, exceeds 110,000 km^2 or about 315 km^2 per hunter or 85 km^2

per person. Ninety five percent of this hunting range covers terrestrial and fresh water environments, 5% is marine.

In 1981-82 Eskimo Point harvested an estimated 247,800 kg of edible meat from these hunting grounds. About 77% of this harvest was secured from terrestrial and fresh water species. Caribou is the staple food in Eskimo Point - that year it was estimated that 180,000 kg were harvested from caribou alone. The next most important species, in terms of kilograms harvested is beluga whale, with almost 41,000 kg being harvested in 1981-82. The third and fourth most important species harvested in terms of weight are arctic char and lake trout with roughly 6,100 kg each being taken. In terms of human food, fish are actually more important than beluga. The muktuk or whale skin is a highly valued delicacy, but the bulk of the weight, the carcasses, are fed to the dogs. The fifth most important species harvested is the ringed seal, an estimated 6,100 kg of meat being taken in 1981-82. Other wildlife species which were harvested but to a much lesser extent include bearded seal, geese (there is in fact a colony of about 300,000 snow geese nesting within 40 km of town), white fish, and occasionally moose, grayling, harp seal, harbour seal, arctic hare, northern pike and eider. The hunters fill their quota of 15 polar bears, take 20 to 40 wolves per year and take up to a few thousand arctic fox when the populations are high (Gamble 1984).

Coppermine, located at the mouth of the Coppermine River, has a population of 870 persons including 270 hunters. Around Coppermine the land is hilly with numerous rock outcrops rising above the tundra vegetation. The tree-line is only 40 km south of town along the Coppermine River. Around Coronation Gulf the hills are less than 100 meters high, a few hundred kilometers inland the topography rises to a maximum of 600 m elevation. The annual precipitation, being 20 cm/year, is only about 3/4 of that in Eskimo Point. The severity of the wind is likewise reduced and the predominant wind direction is from the southwest rather than the north. Being 150 km north of the Arctic Circle, Coppermine receives considerably less sunlight in the winter when the sun hides below the horizon for several days in December and conversely it receives more in the summer than does Eskimo Point. In Coronation Gulf freeze-up begins between mid-October and early November and break-up commences in early July. The closest polynya, or body of open water, in winter is about 120 km northeast of town.

The present day hunting territory of Coppermine exceeds 180,000 km^2 or more than half again the Eskimo Point total range. Eighty two percent of Coppermine's hunting range is terrestrial and 18% marine. The Coppermine hunter covers an average of 800 km^2; or more than double the area covered by Eskimo Point hunters. In other words, the land supports only about one person per 200 km^2 in the Coppermine region.

In 1983 Coppermine harvested an estimated 152,000 kg of edible meat; eighty six percent of this harvest was taken from the land, indicating an even higher dependence upon the land than Eskimo Point which harvested 77% from their land. Like Eskimo Point, Coppermine's most important food source is caribou - some 108,000 kg being harvested in 1983. The Coppermine River, particularly its mouth, and other freshwater bodies in the region provide Coppermine with about 409,000 kg of fish - primarily arctic char and whitefish with lesser amounts of lake trout. About 7,700 kg of ringed seals were taken from Coronation Gulf in 1983, which shows a somewhat higher use of seals than

Eskimo Point. There are no beluga around Coppermine and there are fewer geese but there is a slightly greater diversity of wildlife in the region. Wolverine, wolves and muskox are abundant and moose and grizzly bear are relatively common. Ground squirrels are very common in the Coppermine vicinity and are readily harvested in the spring. In Eskimo Point the few squirrels present are rarely utilized (Jingfors 1984).

Grise Fiord is about 1600 km northeast of Coppermine and further from Eskimo Point, here the Inuit's use of the land and sea differs drastically. Grise Fiord, sitting at the foot of a 600 m mountain overlooking Jones Sound, has a population of about 100 persons from 15 families with 20 hunters. This is the polar desert, the least productive land in North America. Grise Fiord receives only 1.5 cm of precipitation annually. Here, there is no problem of summer travel being impeded by numerous tundra ponds. Here, travel is restricted by the stark realities of the mountains, glaciers, ice caps and polynyas. The minute snow which does fall, does not fall evenly. Some mountain passes become choked by snow drifts while others are impassable because of the lack of snow. It is even difficult to find enough snow to build an igloo. I recall having to travel 15 km in search of igloo snow which we finally located at the base of an iceberg - this was after hunting polar bear for twelve hours at -45°C.

Being over 600 km north of the Arctic Circle, there is a tremendous seasonal variation in day length. The sun is above the horizon 24 hours a day from the end of April until the end of August. The land and the people pay dearly for this later in the year, when the sun sets below the horizon in late October not to return again until mid February.

The sea begins to freeze in late September and doesn't break up until July - some summers the ice never breaks up. Multi-year ice abounds throughout the region as do icebergs which calve from the countless glaciers. The icebergs, glacier faces and ocean currents produce rich upwellings of marine waters that create the all important polynyas for overwintering marine animals. These open bodies of water in Baffin Bay, Hell's Gate, Cardigan Strait, Queen Channel and Penny Strait are the basis of the marine food webs.

The Grise Fiord territory encompasses roughly 235,000 km^2 of mountains, ice caps, glaciers, deserts, lowlands and sea. If we exclude the areas which are totally impassable by skidoo or dog team, including the ice caps, glaciers, mountain tops, barren plateaux and polynyas in winter, the hunting territory shrinks to about 57,000 km^2. Eighty two percent of this accessible hunting territyory is marine - whereas Eskimo Point's and Coppermine's hunting areas are only 5% and 18% marine, respectively.

With the sterility of the landscape it is not surprising that each Grise Fiord hunter requires about 2800 km^2 of land and sea to support the community. This is 3 and 1/2 times the area required by the Coppermine hunters and more than 8 times the area required by Eskimo Point.

In 1983 Grise Fiord harvested 94% of its meat from the sea, unlike Coppermine which took only 14% from the sea and Eskimo Point which harvested 23% from the sea. Grise Fiord's total 1983 harvest was 48,000 kg of edible meat. Ringed seal is the staple food item in Grise Fiord, in 1983 the 727 ringed seals provided approximately 14,500 kg of meat. The next most impor-

tant species in terms of kilograms of edible meat, in descending order of magnitude are harp seal, sea-run char, walrus, polar bear, beluga, bearded seal, narwhal and finally caribou. The 31 caribou shot in 1983 provided only 1400 kg of meat which was half the entire terrestrial harvest. The other half of the terrestrial harvest was composed of 5 muskox, 303 eider, 124 arctic hare, 160 ptarmigan and 32 snow geese. This does not imply that terrestrial species are not important or are not sought after by the hunters. Quite the contrary, the caribou are highly regarded by the people and the hunters go to great efforts to get them (Pattimore no date).

Unfortunately, Peary caribou are rare in the area and the lowlands which support caribou are distant and often inaccessible. Grise Fiord has two main caribou hunting grounds, one a minimum of 150 air kilometers northwest of the settlement around Bjorne Peninsula and Vendom Fiord, and a second one twice the distance, on the west side of Devon Island. Unfortunateley, these areas are very difficult to hunt. In order to get to the Bjorne-Vendom hunting area, hunters must wait until there is ice on the fiords and until there is sufficient snow cover in the mountain passes in October - and then there is no daylight. In darkness the hunters must ascend a half kilometer high glacier that blocks their route. It takes a day's time to carry their gear up to the glacier face. They build an igloo at the bottom of the glacier, toil away in the cold and darkness and build a second igloo for their next sleep on top of the ice wall, just a kilometer away from their first one. After descending from the mountains they must locate their prey, hopefully with the aid of moonlight or starlight - overcast skies make the task impossible. These early winter trips often last a week or two.

I have been discussing these regional differences for several reasons which relate to the Nunavut land claim. Firstly, I wish to stress the tremendous variations in Nunavut in topography, vegetation, wildlife, productivity and the Inuit's dependence upon the land and sea. Due to these radical variations it is not possible to assign a quantum of land to each community, or a quantum of land based on per capita figures. Each community must be able to negotiate their own lands, and the quantum for Nunavut must be the sum of the lands negotiated by each community.

My second point is that due to the barrenness of much of the landscape, a small block of land for each community will not provide the Inuit with any economic potential. The only terrestrial areas within the Grise Fiord hunting territory which can be traversed by snowmobile amount to about 10,000 km^2, and only a small portion of these sites are vegetated.

The 1a lands which each COPE community retained after their claim was settled amounted to 1792 km^2. The 1b lands are equivalent to what we consider to be Nunavut Lands, which lack subsurface rights. A 1792 km^2 area around the settlement of Grise Fiord would encompass virtually no productive land. This would be true of any community in the Baffin Region. The Inuit must be able to retain meaningful pieces of their land in order to become economically self sufficient.

In order for a southerner to appreciate this problem let me put it this way: With some 15 families in Grise Fiord, each family requires roughly 3600 km^2 of land and sea to subsist. Under a COPE type of land settlement, a Grise Fiord family would be given only 120 km^2 of land - no sea. As you will re-

call, only 6% of Grise Fiord's present meat harvest is taken from the land. If their entire harvest had to be taken from the land, each family would require 11,376 km^2 of prime High Arctic land, or a total of about 169,000 km^2 for the entire commuity. There is probably not that much land accessible by snowmobile or dog team in the entire High Arctic.

If we assume for a moment that under a hypothetical COPE style settlement, Grise Fiord receives 1792 km^2 of land or 120 km^2/family, this would be equivalent to putting a southern farm family on a 1.6 acre homestead and telling them to become economically self sufficient rather than giving them 160 acres or one quarter section. With the number of farms in southern Canada larger than 160 acres going into receivership, it is not difficult to imagine what would be the plight of the family on only 1.6 acres!

My final point is that all of the Baffin communities and most of the Keewatin and Kitikmeot communities are tied to the productivity of the sea. The Inuit must be given strong management powers over the Arctic marine waters so that they can manage and protect the marine mammals upon which they depend.

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SCIENCE, TECHNOLOGY AND SOVEREIGNTY

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ABSTRACT

The technological developments of the 1940's stripped the Canadian Arctic of its insular cover. For years this protective shield enabled governments to handle national interests and sovereign encroachments in

a sporadic and ad hoc manner. Times have changed and the three decades following World War II saw a greater rounding-out of Canada than ever before. Although the major developmental thrust still remained in an east-west direction, a north-south dimension developed, increased in strength and became continuous.

Throughout the Canadian Arctic the concept of sovereignty has been poorly defined except, possibly, in legal terms. Making declaratory statements, and issuing proclamations, are not enough as a nation must be capable of exercising its sovereignty in a range of environments. Fundamentally, sovereignty must be defined in terms of the physical environments of land, sea and air as well as in terms of the components of the socio-economic environment. The applied sciences provide many of the tools for exercising the functions of a sovereign state.

Fortuitously, the intensive scientific investigation and inventory taking activities of the decades following the 1940's built a sound foundation on which to exercise sovereignty in all its dimensions of the Canadian Arctic. This period of 'government by science' in the North, during which many hundreds of millions of dollars were spent by the federal government on scientific activities, may have been a high point in Canada's coming to grips with its northern dimension as a circumpolar nation. In retrospect, investment in science may have been one of the cheapest, yet effective means of establishing a sovereign base for our northern lands and seas.

Although a good scientific base has been established, technological follow-on has not always occurred in key environments (e.g. in the air). It is largely accepted that no nation can really assume that it has control and jurisdiction over its air space unless it has the capability of detecting, identifying, and controlling air traffic within that zone.

In April 1970 Canada, through the International Civil Aviation Organization, established a high-level area control service for the Canadian Arctic and the Canadian sector of the Arctic Ocean. Yet we have not installed the equipment to detect and identify some 6,000 flights that annually pass through what Canadians consider to be sovereign air space.

I wish to thank the organizers for inviting me to take part in your Tenth Anniversary meetings. It is indeed an honour to speak to you today and a pleasure to have the opportunity to meet so many former associates. I am a long time supporter of the Association of Canadian Universities for Northern Studies, having been involved with the organization during its formative stages.

In 1946, Lester Pearson made the comment that "the war and the aeroplane had driven home to Canadians the importance of our northland in strategy, in resources and in communications". He could just as easily have said that the technological developments of the 1940's had stripped the Canadian Arctic of its insular state, which for years had enabled successive governments to handle northern interests and sovereign encroachments in a sporadic and ad hoc manner.

The three decades immediately following World War II saw a greater 'rounding out' of Canada than ever before. Although the major developmental thrust continued in an east-west direction, a north-south dimension had developed. It has continued and no doubt will grow in strength. Science played a major role in the development of the north-south dimension as this was a period of extensive scientific investigation and inventory-taking.

The massive amount of scientific, technical and related data on the North accumulated during this period is unparalleled in Canadian history. It is doubtful whether any other country has had such a large section of its territory and people exposed to such intensive investigation over such a prolonged period - about 35 years.

During this time there were a number of significant milestones. The first in 1945 was the founding of the Arctic Institute of North America which was incorporated through an Act of Parliament[1]. The Institute provided a useful mechanism for the Government of Canada to assist in arctic research, which at the time was concentrated in a very small group of scientists in the universities and government. It also provided a vehicle for cooperating with American and other foreign scientists interested in the Canadian Arctic. From a national point of view, the Institute bought time for the development of a creditable northern component in the Canadian scientific community. As interest in northern science increased in Canadian universities, and other institutes formed, the government withdrew financial support from the Arctic Institute in the early 1970's.

From about the time of the formation of the Arctic Institute of North America, and continuing for 25 years, the Defence Research Board (DRB) provided a Canadian counterweight to the increasing U.S. military interest in northern research. The Board supplied the means for cooperating with American as well as other military scientists in northern research. For 15 years, DRB spearheaded government research in the High Arctic on a continuing basis.

In 1960, the Polar Continental Shelf Project (PCSP) launched its first full scale program. It had been established in 1958 by the Advisory Committee on Northern Development and operated by the Department of Energy, Mines and Resources. The primary task of the Project was to assist and, where appropriate, conduct research in remote areas of the Polar Continental Shelf to enhance Canadian sovereignty. The underlining political concern was the retention of our sovereign rights in the outer reaches of the Canadian Arctic. PCSP has operated for over 25 years with an enviable record. Although this is not the place to go into the details of the Shelf's activities, I certainly would be remiss if I didn't mention that the Project has more than met the expectations of the group of government officials who authorized its formation in 1958.

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[1] See, for example, Roots et al 1987.

In 1962, the Northern Scientific Training Program was initiated by the Department of Indian Affairs and Northern Development. Its purpose was to create a pool of Canadian scientists interested in northern research through encouraging students to become involved in scientific activities in the North. Funds in the form of grants were made available to offset the high cost of getting students into the North. The Program has been quite successful.[2]

In 1977, the Association of Canadian Universities for Northern Studies was formed by universities with institutes, programs or scholars interested in the North. This organization has provided a medium for the exchange of information and for cooperation amongst member universities. It is also a means for obtaining and utilizing the views of some 700 northern scholars.[3]

In my view, these five activities represent major events in the evolution of northern science in Canada. Naturally, there have been many important short term projects, surveys or other activities but in most cases they were either related to, or supported by, one or more of these major events. During these three decades of scientific investigation, it is conservatively estimated that the federal government has spent over one-third of a billion dollars on scientific activities in the Yukon and Northwest Territories. In one ten year period (1974-1984) $157 million were spent, and in one year (1975-76), $42 million. In addition, some $10 million were contributed to northern research by Canadian universities.

In the late 1950's, the search for hydrocarbons, and to a lesser degree other minerals, introduced twenty years of intensive resource inventory-taking and related programs of environmental research. Upwards of several billions of dollars were spent by industry in this effort, somewhere short of a billion in the Beaufort Sea alone. Much of industry's efforts were heavily supported by federal incentive programs and grants.

In retrospect, the period (1945-75), which I like to think of as "government by science", has been a major factor in developing the north-south dimension of the country, and its maturing as a circumpolar nation. As mentioned earlier, we have to think North, we have to think cold. The last major upturn in the cost of energy had quite an impact on making Canadians think as Northerners. With another significant upturn, Canadian characteristics may change sufficiently to be more in keeping with the circumpolar environment in which we live.

It is well worth noting that to invest in scientific investigation may have been one of the least expensive, yet effective, means of enhancing our sovereignty throughout northern Canada. At this time, it is difficult to assess to what extent Canada will benefit internationally or domestically from this period of intensive activity. Some preliminary observations are possible, however.

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[2] See, for example, Finkler 1987.
[3] See, for example, the paper by Lloyd, in this volume.

On the international scene our northern research has gained the attention of world scientists in a range of disciplines. As well, our efforts have come to the attention of the research and development sectors of foreign industry. One can say for certain that our northern science is no longer a scientific backwater. Through this respectable scientific knowledge base we have enhanced our sovereignty in the North and have become more creditable as a circumpolar nation. Thus we are in a much better position to play a meaningful role in the circumpolar community, providing we have the will to do so. The will to do so is a very important factor and a matter of conditioning.

Domestically, to paraphrase Louis-Edmond Hamelin, we have now reached a 'critical mass' level of interest in the North which in the future will make it more difficult for politicians and bureaucrats to lapse into periods of forgetfulness and negligence concerning our northern interests. Although we have established a creditable northern scientific base which greatly strengthened sovereignty throughout the region generally, in the two critical environments of sea and air we have not followed through with the technology required to maintain sovereign interests. Until we build on our scientific base with the introduction of appropriate technology, our sovereign interests will remain challenged. I would like to say a few words about the current airspace surveillance situation in the North.

It is a widely accepted principle that no nation can assume that it has control or jurisdiction over its airspace unless it has the capability of detecting, identifying and controlling aeroplanes within that zone. In April 1970, Canada, through the International Civil Aviation Organization (ICAO), established a high level area control service for the Canadian Arctic including the Canadian section of the Arctic Ocean. Although Canada has let the world know that it is responsible for control of air traffic in this area, no equipment has been installed to detect or identify flights that pass over much of the territory - seventeen years after the ICAO arrangement.

It is quite ironic that Canadians can become upset with the passage of a foreign vessel, the Polar Sea, through our arctic waters when at the same time some 6,000 flights pass through our northern airspace annually without our ability to detect their presence .... and hardly a voice is raised. For a nation that appears so sensitive to encroachments on its arctic territory, this is rather an illogical situation.

Probably we would not be in this unsatisfactory position if the two Federal agencies responsible for surveillance and control, and therefore the sovereignty and security of our airspace, had joined forces in developing and operating a national airspace surveillance and control system. The technology is available but unfortunately a national position on surveillance of Canadian airspace has been lacking. This is costly for Canada both financially and politically. The lack of a national system leads to difficulty in upholding national interests when arranging airspace surveillance agreements with our neighbours, particulary the USA.

The Americans have a Joint Surveillance System operated by the Department of Defense and the Transport Department, which rings their country with radars. A number of other countries have similar integrated systems. It would seem natural that Canada also should have a common system. If there had been

a national surveillance plan and a common system in place, the large gaps in surveillance that exist today would not likely have occurred. The technical upgrading of the Distant Early Warning System (DEW LIne) although meeting NORAD requirements and satisfying the US and Canadian military, leaves much to be desired in meeting Canadian air surveillance needs. Continuing advances in air surveillance technology strongly indicate a need for a joint Canadian command and control system to economically meet sovereignty and security requirements and to uphold national interests when negotiating air surveillance agreements with our neighbours.

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POLAR SCIENCE

LES SCIENCES POLAIRES

POLAR SCIENCE

Introduction

The Hon. Bill McKnight, Minister of Indian Affairs and Northern Development, chose ACUNS' Tenth Anniversary Meetings as the occasion for the release of the report 'Canada and Polar Science' (Roots et al 1987). Professor T.H.B. Symons delivered the Minister's speech and officially released the report.

The enquiry which resulted in Canada and Polar Science stimulated more than a year of debate on Canada's contributions to science in the polar regions. This debate was conducted in parallel with the later stages of a similar process in the United States. We were delighted to be able to use these particular ACUNS meetings as a platform for both Canadian and U.S. opinions on this important matter, and we were fortunate and honoured to have Dr. A. Lincoln Washburn as guest speaker on the U.S. side of things. Dr. Washburn is a distinguished polar scholar in his own right, in recent years he has made considerable contributions to discussion of polar science in the U.S.

We were also fortunate in that most of the 'Canada and Polar Science' group were able to attend the Ryerson meetings to discuss their reports. They were joined, in a panel discussion, by Dr. R.R. Janes, Executive Director of the Science Institute of the N.W.T. which has an obvious special interest in this topic.

Professor T.H.B. Symons, Vanier Professor, Trent University, is a distinguished Northern Studies scholar who has taken an interest in organizational and policy aspects of research and education in the Canadian North for many years. ACUNS was delighted that he was able to accept the Minister's invitation to make the presentation and comment on the newly released report.

This Section of the Tenth Anniversary volume deals with polar research in both Canada and the United States, to, we hope, their mutual advantage. It concludes with a summary of Canada and Polar Science in both official languages.

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CANADA AND POLAR SCIENCE

Notes for an address
by
Dr. Thomas H.B. Symons
Vanier Professor, Trent University

on behalf of

The Honourable Bill McKnight
Minister of Indian Affairs and Northern Development

to the Annual Meeting of
the Association of Canadian Universities for Northern Studies
Ryerson Polytechnical Institute, Toronto, Canada
1 May 1987

Good evening, Ladies and Gentlemen:

Thank you for your invitation to this Conference Dinner and for the opportunity to speak on behalf of the Hon. Bill McKnight, the Minister of Indian Affairs and Northern Development, who regrets that he is unable to be with us this evening.

I must confess, Mr. President, that I was surprised when the Minister called to ask if I would speak for him. What, I asked, would he want me to say? To which he replied, very gamely, that he would be pleased to have said whatever it was that I might want to say. What a splendid opportunity to make policy and/or to make mischief! With just a little imagination one could even bring down a government. However, I have resisted this temptation. It would only get us both into hot water.

So, first, may I present to you the Minister's statement, and then may I venture to add just a few remarks of my own.

The Minister has received the report "Canada and Polar Science". It is being officially released this evening and copies are now available. I understand, however, that, because of typographical problems, it is subject to further minor editorial amendments and corrections.

You may recall that Mr. McKnight's predecessor, the Honourable David Crombie (who was, of course, on the faculty of our host university), established a Working Group in 1985 to make recommendations concerning the establishment of a National Polar Institute for Canada. The Working Group was to survey the country's arctic scientific activities, the accessibility and distribution of information, and the national and international contacts between arctic scientists and other interested parties and organizations.

Particular attention was to be given to the information and research needs of northerners in arctic and scientific affairs. The Working Group's terms of reference also included the question of applying arctic research to industrial and policy areas, and a review of the effectiveness of our present institutions in support of Canada's international role in polar affairs.

Looked at more closely, as everyone here is aware, those topics have hidden dimensions just like icebergs - where crags above the surface tell us that there is hidden bulk below.

Before discussing the draft of the iceberg, however, I would like to offer Mr. McKnight's thanks to the four members of the Working Group: to the Chairman, Fred Roots (of Environment Canada), and to Mark Gordon (of Makivik Corporation), Peter Burnet (formerly with the Canadian Arctic Resources Committee) and Peter Adams (of ACUNS and Trent). I believe that three, at least, of these people are here this evening. They have produced a fine report. It is logically organized, clear in both its reasoning and recommendations, and lucidly written. I'm not going to tell you that it will drive the latest best seller from the bookstore shelves, but it is a pleasure to come across a report which treats such a complex subject with practicality, and, may I add, with profundity and grace.

The four authors are thanked by the Minister for a job well done.

The Working Group makes seven recommendations.

They submit that there should be no new institution dedicated to undertaking, funding or managing polar research, now or in the near future. Thus, they do not propose the establishment of an institute as such.

Instead, they recommend a number of innovative initiatives:

One, the establishment of a Canadian Polar Research Commission, reporting independently to a senior level of government, to regularly appraise northern and polar science in Canada and suggest improvements in substance or method;

Two, the development of a Polar Information System, building upon and linking existing government, academic and industrial scientific information and bibliographic systems in Canada. They further recommend making the new system compatible with other, international, polar-related information systems;

Three, the creation of a centre, tentatively called Polar House, to function as a "network" centre and to focus contact, communication, and interest on northern Canada. They envisage a variety of existing polar groups coming together as 'tenants' of Polar House, including, for example, ACUNS, the offices of the Northwest Territories and of the Yukon Territory, and others. The functions of Polar House would include making our commitment to polar science more visible, both domestically and internationally;

Four, increased support for northern institutions engaged in research activities and for northerners in national institutions, and the promotion of northern access to their recommended Polar Information System;

Five, the foundation of a national polar science communications centre as part of Polar House to provide information to the public about the North, the polar regions and Canadian polar science.

Six, finally, they recommend that federal departments with ongoing polar science functions cooperate with the proposed Polar Science Commission to identify priorities and effectiveness in their areas of inquiry.

Throughout the report, its authors stress greater involvement by northerners and their institutions in determining priorities for polar research and its actual undertaking.

A major feature of all the recommendations is their economy. There is a consistent emphasis on extracting the most from what we already have. The report foresees that some of the practical effects of implementation will be to raise research standards by encouraging peer review, breaking down the isolation of dispersed scientific activities, and the achievement of what the report calls a research "critical mass".

As I mentioned earlier, the report is also quite opposed to creating a new institution which could duplicate the efforts or procedures of organizations already working in the field. What the proposal of a Polar Research Commission offers is a way of developing and sustaining a national awareness of and commitment to increasing our knowledge about northern Canada. Its functions could easily make it an institutional monitor which ensures that the knowledge we collect is relevant to the needs of Canadians and accessible to them.

So far, I have talked about a series of initiatives as a way of making our polar and northern research more efficient and effective but there are other important reasons why we should act quickly. Here is where I return to my metaphorical iceberg.

The reasons are Canada's commitment to enhancing Canadian arctic sovereignty, developing our circumpolar relations, and fostering responsible government in the North.

Everyone is aware that, on one level, sovereignty is about territorial boundaries. As well as physical limits however, sovereignty is about mental horizons. The control and influence of our own destinies is widened or shrunk by our knowledge of northern, and polar, lands. Nowhere else in Canada, for example, is there a need for more care about the relationship between people and the environment than in the Arctic. The ultimate base of arctic sovereignty is knowledge.

Sovereignty is not just a matter of where the pegs go on international boundary lines. It also sets the limits of Canadian law, and the protection of those laws for the citizens. Our claim becomes stronger the more we are seen as being actively involved in international organizations with activities centred in the region. Just as the initiatives recommended by the Working Group could define our North more clearly for Canadians, so they could shape the dialogue of our international relations.

Our circumpolar involvement already includes major positive aspects. These include cooperative activities such as the recently renewed Canada/USSR Arctic Science Exchange Programme and the recent official Exchange of Letters between Canada and Norway on Science and Technology. Other familiar examples are the Inuit Circumpolar Conference and Indigenous Survival International. All of these have projected Canada's interests internationally.

As noted before, the other major pertinent issue is fostering responsible government in the North. Many northerners are concerned that they cannot properly participate in scientific activities controlled from southern Canada. This government's clear policy for the North is that decisions affecting northerners and northern governments must be made by the people most directly affected by them. Northerners believe that economic, social and educational benefits will flow from increased participation in and control of northern science. The economic benefits would come directly through employment in positions that have influence in the political and social development of the North, and, in the long-term, through economic development initiated and controlled by northerners.

While Canada's polar science community focuses on knowledge, it cannot keep itself completely apart from the fundamental debate among northerners about their long-term political, economic, and social future. Informed northern choices about responsible government must be based on accurate knowledge of all aspects of the arctic environment. This means that we have a responsibility to support home-grown institutions. I am thinking of examples such as the Science Institute of the Northwest Territories, the research activities of Makivik Corporation, or any initiatives which may grow out of the agreement on science and technology recently signed by Mr. McKnight, the Minister of Indian Affairs and Northern Development, the Honourable Frank Oberle, Minister of State for Science and Technology, and the Yukon Government.

May I say, in parenthesis, that it was an honour that I particularly valued to be invited by the then Minister of Indian and Northern Affairs, the Honourable Hugh Faulkner, in April, 1979, to chair the meeting in Ottawa which led to the development of the present Science Institute of the Northwest Territories. I am delighted that there are here tonight the first Executive Director of the Institute, Dr. Robert Janes, and its distinguished founding Chairman, James M. Harrison; and also Keith Greenaway who laid the groundwork for that key meeting.

It makes sense to develop scientific training and education within our arctic regions and to blend older indigenous knowledge and insights with the gains from the disciplines of modern science. It would be advantageous to encourage communication between northern scientific groups and between the northern groups and the southern mainstream, and counterparts in other polar and non-polar nations. The Working Group's report concerns itself greatly with these matters.

As a major Arctic country, Canada must be a world leader in the development of polar knowledge and technologies. A cohesive national effort is important not only for specific immediate concerns like the enhancement of Canadian sovereignty in the Arctic, but also to ensure the future of the Canadian North, its peoples and its environment. Accordingly, the current

review of the state of Canadian polar research is a high priority and Mr. McKnight intends to seek the advice of his colleagues, and of the polar research community in Canada and Northern leaders, on how best to respond to the recommendations.

The quality and vigour of polar research in Canada is important to all Canadians. This report presents a valuable opportunity to assess our current challenges and future needs.

REMARKS BY DR. T.H.B. SYMONS

Ladies and Gentlemen

That was the Minister's speech. The Report is now available and I understand that a summary is available in Northline/Point Nord. You, like me, will be able to read it thoroughly before going to bed so as to be able to participate fully in tomorrow morning's debate!

I hope that everyone here will respond vigorously but constructively to the Report and to its specific Recommendations. Occasions like this only become opportunities if we make them so.

As a student of history who has a longstanding interest in and involvement with the North and Northern scholarship, I would like to conclude by endeavouring to place the Report in some sort of context.

We are all now more or less familiar with the ups and downs of interest in the North and in northern scholarship (interest in the 'scholarship' has not, of course, always coincided with interest in the North!).

Between the two World Wars, that remarkable man, Stefansson, did a tremendous job of raising the awareness of Canadians, scholars and non scholars, of things Northern.

In terms of the North, one of the principal features of the scholarly fallout of the Second World War and the following Cold War, was the establishment of the Arctic Institute of North America by Act of Parliament 1945. The Institute played a key role in laying the foundations of the "knowledge base of Canada's Arctic Sovereignty".

The 1960's were a period of enormous expansion in our universities and it is not surprising that there was much talk of a 'University of the Arctic' in Canada, perhaps one modelled after the University of Alaska which, by then, was already many decades old. In the early 1970's some groups did indeed move to establish such an institution.

During the 1970's, my own Commission report on Canadian Studies, Keith Greenaway's "Science and the North" (the Mont Gabriel meetings), and the Science Council's report "Northward Looking" were examples of attempts to focus and improve Northern education and research in Canada. It was no coincidence that ACUNS was formed at that time and so is celebrating its 10th Anniversary here at Ryerson.

ACUNS was (and is) the universities coming together to help Northern Studies and the North. I am delighted that Professor Trevor Lloyd, who did so much to create ACUNS, is with us tonight.

While the universities and others in 'the South' were becoming more organized with respect to Northern Studies, great strides were being made in the North - or perhaps I should say the Norths. In the Northwest Territories alone, for example, the Arctic Co-operatives management training programmes were in full swing and the seeds for Arctic College were being sown. These and other endeavours began to build up an indigenous scholarly base in the North.

It was in 1979 that we brought to a conclusion studies of the organization of science in the Yukon and the N.W.T. so as to lay some of the foundations upon which the Science Institute of the N.W.T. was built.

As a result of all of these activities and more, the authors of the Report which was released this evening found themselves overviewing a very different Northern scholarship scene than that which existed even a decade ago when ACUNS was founded.

Someone has said that there are more universities involved in Northern education and research today than there were graduate students working in the N.W.T. in the 50's. That may or may not be true, but the picture of dramatic growth in Northern Studies which it evokes is real.

There is a truly remarkable amount of scholarly activity in Canada's North today. This Report presents another opportunity for us to focus and refine that activity.

I personally hope that we, the university community of Canada, at least, will seize any advantages which the Report presents for the betterment of the North and of Northern Studies.

At these 10th Anniversary celebrations, I would like to pay tribute to ACUNS and its member institutions for their contribution to the advancement of Canadian scholarship in and about the North. I would also like to mention that group which is today known as the Scientific and Circumpolar Affairs Directorate of the Ministry of Indian Affairs and Northern Development. While this group is but a tiny cog in the huge departmental machine, it has initiated, nurtured and protected a remarkable variety of undertakings which are important to all of us here in this room. I would mention only, for example, the Northern Scientific Training Program, the Circumpolar Exchange Program, the Northern Science Award, the northern field stations, and, indeed, ACUNS itself. M. Donat Savoie and his colleagues deserve more recognition than we sometimes take the trouble to give.

Finally, I applaud the Working Group's consistent attention to the international perspective. This is reflected in their sensitivity to broader circumpolar considerations. You may also have noted the frequent use of the word 'Polar' in the Minister's remarks and the occasional use of the phrase 'Polar and Arctic'. This is in response to the Report's emphasis on south polar as well as north polar international affairs.

I have recently returned from an academic assignment which involved visits to universities in eight countries. This experience reinforced my view that scholars everywhere need to be aware of the dangers of national parochialism. Canadian academics are no exception.

As far as Northern Studies are concerned, as the Report points out, we have a particular problem in this regard. It is relatively easy for, say, Monaco to establish (as it has done from time to time) something of a reputation in polar studies. An expedition or two, a museum, a few books and an international conference and Monaco is well established in Polar Studies.

We, on the other hand, as one of the major polar nations have enormous domestic and global responsibilities in the North which must be met on a daily basis. We have to perform those huge daily chores necessary to meet the responsibilities of a nation with citizens and lands which are 'northern' or 'polar' by any and every criterion. These responsibilities make great demands on scholars as they do on other sectors of our society.

Of course, these obligations present us with opportunities and creative challenges which are somewhat lacking in Monaco. On the other hand, for a small population in a huge northern land, they represent a risk that we may become so overwhelmed by the domestic scene that we have not energies left for the international scene - in this case the North and South Polar scene.

In my view, as scholars (or simply, if you wish, as citizens) in a major polar nation, we are morally obligated to contribute at the international polar level. We have knowledge and expertise which must be shared with other polar peoples. Similarly, as a small community of scholars struggling with the problems and opportunities of a great northern land, we must also draw on international scholarship, to the greatest extent possible, in order to properly fulfill our domestic and global polar obligations.

The report of the Working Group which the Minister presents to you tonight is, I think, a first-rate piece of work. It could and should prove to be a landmark document. The quality, range and vigour of polar research in Canada are important to all Canadians, and to the international community. This report presents a rare and valuable opportunity to build on our strengths, to identify our weaknesses, and to anticipate the future needs of the knowledge base of Canada's Arctic activities - and, indeed, of sovereignty itself.

I wish you well in your deliberations on this important report.

Thank you.

End note

The following might be of interest to readers of Dr. Symons' address (eds.).

Northward Looking, A strategy and a Science Policy for Northern Development, Science Council of Canada, Report No. 26, 1977.

Science and the North, A Seminar on Guidelines for Scientific Activities in Northern Canada, Mont Gabriel, Quebec, Advisory Committee on Northern Development, Government of Canada, 1972.

Sixth Annual Conference, Regina, Saskatchewan, Report 1983, Association of Canadian Universities for Northern Studies, Ottawa, Ontario 1983.

To Know Ourselves, T.H.B. Symons. The report of the Commission on Canadian Studies, Association of Universities and Colleges of Canada, Ottawa, 2 vols., 115 p., 1975.

LE CANADA ET LA SCIENCE POLAIRE

Notes pour le discours
prononcé par
M. T.H.B. Symons
Professeur titulaire de la chaire Vanier, l'Université Trent
au nom de
L'Honorable Bill McKnight
Ministre des Affaires indiennes et du Nord canadien

lors de l'Assemblée annuelle de
l'Association universitaire canadienne d'études nordiques
au
Ryerson Polytechnical Institute, Toronto, Canada
Le 1er mai 1987

Mesdames et messieurs, bonsoir.

Je vous remercie de votre invitation et de l'occasion que vous me donnez de parler au nom du ministre des Affaires indiennes et du Nord canadien, l'honorable Bill McKnight, qui a exprimé ses regrets de ne pouvoir être avec nous ce soir.

J'ai été surpris, j'en conviens, Monsieur le président, quand le Ministre m'a téléphoné pour me demander de parler à sa place, et je me suis enquis de ce qu'il voulait que je dise. Il m'a répondu alors, crânement, qu'il serait satisfait d'avoir dit tout ce que je jugerais bon de dire. Quelle occasion magnifique de contribuer à la politique de l'État ou ... de semer la zizanie. Avec un peu d'imagination, j'aurais même pu ébranler le gouvernement! Mais j'ai résisté à la tentation, car nous nous serions tous deux attiré des ennuis.

Je vais vous présenter le discours du ministre, et après j'ajouterai quelques remarques.

M. McKnight a reçu le rapport sur "Le Canada et la science polaire". Ce rapport est rendu public aujourd'hui et des exemplaires en sont maintenant disponibles. Cependant j'ai appris qu'à cause de difficultés typographiques,

le texte est en cours de légères modifications et corrections.

Vous vous souviendrez que le prédécesseur de M. McKnight, l'honorable David Crombie, avait chargé un groupe de travail, en 1985, de faire des recommandations sur la création éventuelle d'un institut polaire national au Canada. Le groupe de travail devait faire le point sur les activités scientifiques canadiennes relatives à l'Arctique, sur l'accessibilité et la diffusion des informations, et sur les rapports nationaux et internationaux entre les savants spécialisés dans l'Arctique et les autres parties et organisations intéressées.

Une attention toute particulière devait être accordée aux besoins en information et en recherche des habitants du Nord en ce qui a trait à l'Arctique et à la science en général. Le cadre de référence du groupe de travail comportait également la question de l'application de la recherche relative à l'Arctique dans les domaines industriel et administratif, ainsi que l'évaluation de la capacité des institutions actuelles à appuyer la position du Canada dans les affaires polaires internationales.

Quand on les regarde de plus près, on s'aperçoit que ces sujets sont comme la pointe de l'iceberg: l'essentiel est caché.

Mais avant d'explorer les dessous de l'iceberg, j'aimerais faire part des remerciements de M. McKnight aux quatre membres du groupe de travail, c'est-à-dire à M. Fred Roots, son président, et à Messieurs Mark Gordon, Peter Burnet et Peter Adams. Ils ont produit un bon rapport, organisé logiquement, clair dans son raisonnement et ses recommandations, et rédigé avec lucidité. Je n'irais pas jusqu'à dire qu'il va fracasser tous les records de vente en librarie, mais c'est un plaisir de parcourir un rapport qui aborde de façon pratique un sujet si complexe, et j'ajouterais, avec délicatesse et pénétration.

Le groupe de travail fait sept recommandations.

Ils soutiennent qu'aucune nouvelle institution vouée à la réalisation, au financement ou à la gestion de la recherche ne devrait être créée, ni maintenant, ni dans un proche avenir. Aussi ne proposent-ils pas la création d'un institut proprement dit.

Ils recommandent plutôt la prise d'un certain nombre de mesures originales:

- la création d'une commission de la recherche polaire canadienne, qui relèverait d'une haute autorité gouvernementale et serait chargée d'évaluer régulièrement l'état de la science du Nord et des régions polaires au Canada et de suggérer des mesures visant à l'améliorer.

- la mise au point d'un système d'information polaire, constitué à partir des systèmes de données, scientifiques et d'information ainsi que des systèmes bibliographiques, en provenance des secteurs gouvernementaux, universitaires et industriels du Canada, relié à ces systèmes et compatible avec les autres systèmes d'information polaire internationaux.

- la création d'un centre, appelé provisoirement Maison polaire, qui soit un point de contacts, de communications, et un lieu de travail accessible à tous les particuliers et organismes intéressés par le Nord canadien, par exemple AUCEN, les bureaux des T.N.-O et Yukon, et autres. La fonction de la Maison polaire serait d'exprimer en elle-même, de façon tangible, notre engagement à soutenir la science polaire, au Canada et dans le monde.

- l'augmentation du soutien accordé aux institutions du Nord s'adonnant à des activités de recherche ainsi qu'aux habitants du Nord travaillant dans des institutions nationales, et la prise de mesures visant à faciliter l'accès des gens du Nord au système d'information polaire recommandé.

- la création d'un centre de communications national relatif à la science polaire, dans le cadre de la Maison polaire, qui serait chargé de fournir à la population des informations sur le Nord, sur les régions polaires et sur la science polaire canadienne.

- enfin, le groupe de travail conclut que les ministères fédéraux ayant des fonctions scientifiques permanentes touchant le Nord devraient collaborer avec la commission scientifique polaire proposée pour définir les priorités et les activités les plus utiles de leurs secteurs de recherche respectifs.

Tout au long de leur rapport, les auteurs mettent l'accent sur l'importance qu'il y aurait à faire participer davantage les gens du Nord et leurs institutions à la définition des priorités de la recherche polaire et à la réalisation des activités de recherche elles-mêmes.

L'un des grands traits distinctifs des recommandations est leur caractère économique. L'accent est mis constamment sur la nécessité de faire plus avec ce que nous avons déjà. Les auteurs du rapport prévoient que les conséquences pratiques de la mise en oeuvre de celui-ci seront, entre autres choses, l'amélioration des normes de la recherche (en encourageant les examens par des pairs, ce qui brisera l'isolement des activités scientifiques), et l'accumulation de ce que le rapport appelle une "masse critique" de connaissances.

Comme je l'ai déjà mentionné, le groupe de travail est tout à fait opposé à la création d'une nouvelle institution qui ferait double emploi avec les procédures et organisations existant déjà dans ce domaine. La création de la commission de la recherche polaire proposée serait une manière de faire mieux comprendre et accepter, dans tout le pays, notre engagement à accroître nos connaissances sur le Nord canadien. Cette commission pourrait facilement fonctionner comme un organisme de contrôle qui assurerait que les connaissances que nous accumulons répondent aux besoins des Canadiens et leur sont accessibles.

Jusqu'à présent, j'ai cité une série de mesures qui permettraient de rendre notre recherche nordique et polaire plus efficace, mais il y a d'autres raisons importantes pour lesquelles nous devrions agir au plus vite. Et c'est là que je reviens à mon iceberg.

Ces raisons sont l'affirmation de la souveraineté canadienne dans l'Arctique et de développer ses relations circumpolaires, et le renforcement des responsabilités des gouvernements du Nord.

Tout le monde sait que, sur un certain plan, la souveraineté a trait aux frontières territoriales. Cependant, la souveraineté est aussi affaire de mentalité. Le contrôle ou l'influence que nous exerçons sur notre propre destin dépend des connaissances que nous avons sur notre région nordique, de l'utilisation que nous en faisons et de la présence que nous y maintenons. Nulle part ailleurs au Canada la relation entre les hommes et l'environnement est-elle aussi importante que dans l'Arctique.

La question de la souveraineté ne consiste pas seulement à savoir où doivent se situer les bornes frontières internationales. Elle consiste également à savoir jusqu'où s'étend la loi canadienne, et la protection que cette loi accorde à nos concitoyens. Plus nous serons actifs dans les organismes internationaux ayant des activités dans le Nord, plus nos revendications seront solides. De même qu'elles pourraient aider les Canadiens à prendre davantage conscience de l'existence du Nord, les mesures recommandées par le groupe de travail pourraient influer sur nos relations internationales.

Notre présence dans le monde circumpolaire comporte déjà quelques aspects positifs importants. On pourrait citer certaines activités de coopération telles que l'entente canado-soviétique, récemment renouvelée, sur la coopération scientifique dans l'Arctique et dans le Nord. On pourrait donner également des exemples plus connus, tels que la Conférence circumpolaire inuit et l'Organisation internationale de survie des autochtones. Toutes ces activités ont permis de donner une dimension internationale aux intérêts du Canada.

Comme je l'ai déjà dit, l'autre question dont il faut tenir compte est le renforcement des responsabilités des gouvernements du Nord. De nombreux habitants du Nord s'inquiètent de ne pas pouvoir participer véritablement à des activités scientifiques contrôlées à partir du Sud du pays. La politique clairement affirmée du présent gouvernement, en ce qui a trait au Nord, est que les décisions touchant les habitants et les gouvernements du Nord doivent être prises par ceux qu'elles touchent le plus directement. Les gens du Nord croient que le fait de jouer un plus grand rôle dans la science polaire leur rapportera de nombreux avantages économiques, sociaux et éducatifs. Les avantages économiques découleraient directement de l'occupation de certains postes permettant d'influer sur l'évolution politique et sociale du Nord, et, à long terme, de la réalisation de certains projets de développement économique lancés et contrôlés par les habitants du Nord.

Quoique la communauté scientifique polaire canadienne s'intéresse surtout à la recherche, elle ne peut s'isoler complètement du débat fondamental qui se déroule parmi les gens du Nord sur leur avenir politique, économique et social à long terme. Les décisions qui seront prises dans le Nord sur les responsabilités gouvernementales devront être fondées sur une connaissance exacte de tous les aspects de l'environnement de l'Arctique. Cela signifie que nous devons appuyer les institutions locales. Je pense par exemple à l'Institut scientifique des Territoires du Nord-Ouest, aux activités de recherche de la Société Makivik, et à toutes les activités qui pourraient découler de l'entente sur la science et la technologie récemment signée par le ministre des Affaires indiennes et du Nord canadien, M. McKnight, le ministre d'Etat chargé

des Sciences et de la Technologie, M. Frank Oberle, et le gouvernement du Yukon.

J'ajouterais, entre parenthèses, que j'ai été particulièrement honoré d'être invité, en avril 1979, par l'honorable Hugh Faulkner, alors ministre des Affaires indiennes et du Nord, à présider la rencontre d'Ottawa qui a conduit à la mise sur pied de l'actuel Institut scientifique des Territoires du Nord-Ouest. C'est avec plaisir que je remarque, parmi l'assistance, M. Robert Janes, premier directeur général de l'Institut, et son distingué président-fondateur, M. James M. Harrison, de même que M. Keith Greenaway, qui avait jeté les fondements de cette rencontre cruciale.

Il est raisonnable de développer la formation et l'éducation scientifiques dans nos régions arctiques et de fondre les connaissances scientifiques traditionnelles des autochtones avec celles de la science moderne. Il serait bon d'encourager les communications entre les groupes scientifiques du Nord et ceux du Sud, ainsi qu'avec les groupes équivalents des nations polaires et non polaires.

Le Canada étant un pays arctique important, il se doit d'être un chef de file, au niveau mondial, en ce qui concerne le développement des connaissances et des technologies polaires. Un effort cohésif national est important, non seulement pour des préoccupations immédiates comme l'affirmation de la souveraineté canadienne dans l'Arctique, mais également pour assurer l'avenir du Nord canadien, de ses habitants et de son environnement.

L'examen actuel de la situation de la recherche polaire canadienne constitue donc une priorité et M. McKnight a l'intention de solliciter l'avis de ses collègues, de la communauté scientifique polaire au Canada et des dirigeants du Nord sur les meilleurs moyens à prendre pour répondre aux recommandations.

La qualité et la vigueur de la recherche polaire au Canada est importante pour tous les Canadiens. Ce rapport constitue une occasion inestimable d'évaluer nos défis actuels et nos besoins futurs.

REMARQUES DE M. T.H.B. SYMONS

Mesdames et Messieurs

Tel était le contenu de l'allocution du Ministre. Le Rapport est maintenant disponible, et j'ai appris que Point Nord/Northline en a publié le sommaire. Tout comme moi, vous pourrez lire soigneusement avant d'aller vous coucher, afin d'être prêts à participer totalement au débat de demain matin.

J'espère que tous les participants réagiront avec vigueur, mais de façon constructive, aux conclusions du Rapport, et à ses recommandations particulières. Cette possibilité d'intervention ne sera valable que si on la saisit.

En tant que passionné d'histoire, intéressé depuis longtemps par les problèmes nordiques et participant aux recherches pertinentes, je voudrais maintenant placer le Rapport dans le contexte qui lui convient. Nous connaissons tous plus ou moins le cycle de l'intérêt accordé au Nord et aux études nordiques, puis de délaissement (bien entendu, l'intérêt pour les

études n'a pas toujours coïncidé avec l'intérêt accordé au Nord!).

Entre les deux guerres mondiales, Stefansson, cet homme remarquable, a fait un effort hors du commun pour sensibiliser les Canadiens, universitaires ou non, avec les questions nordiques.

C'est la création de l'Arctic Institute of North America, par un Acte du Parlement en 1945, qui fut l'une des retombées marquantes, sur le plan des sciences nordiques, de la Seconde guerre mondiale et de l'affrontement Est-Ouest qui s'ensuivit. Cet Institut a joué un rôle capital dans le développement de la "base de connaissances grâce auxquelles le Canada conforte sa souveraineté sur son territoire arctique".

Les années 1960 ont été marquées par un énorme développement des universités canadiennes; aussi n'était-il pas surprenant qu'on parlât souvent d'une Université de l'Arctique canadien, organisée selon les lignes de force de l'Université de l'Alaska, qui avait déjà plusieurs décennies d'existence. C'est ainsi que, peu après 1970, certains groupes s'efforcèrent d'ouvrir la voie à une telle création.

Au cours des années suivantes, le Rapport sur les Études canadiennes, présenté par la Commission que je dirigeais, l'ouvrage de Keith Greenaway: "La Science et le Nord" (issue de la Rencontre du Mont-Gabriel), et le Rapport du Conseil des sciences du Canada: "Perspective boréale" proposèrent l'amélioration et la spécialisation de l'enseignement et des recherches nordiques au Canada. Ce n'est pas par simple coïncidence que l'on créa l'AUCEN à cette époque; et c'est pourquoi nous célébrons maintenant son dixième anniversaire à l'Institut Polytechnique Ryerson.

L'AUCEN était (et est toujours) formée d'universités s'efforçant de développer les études nordiques et d'aider le Nord canadien. Je vous signale avec plaisir que le Professeur Trevor Lloyd, qui a tant fait pour la création de l'Association, est parmi nous ce soir.

Bien que, dans le Canada méridional, les universités et d'autres intéressés s'efforcent de mieux articuler leurs efforts en vue de développer les études nordiques, c'est dans le Nord, et je devrais dire dans les divers Nords, que l'on accomplit les progrès les plus rapides. Par exemple, dans les seuls Territoires du Nord-Ouest, des programmes de formation à la gestion des coopératives arctiques sont en pleine activité, et l'on élabore les plans d'un Collège de l'Arctique. Ces initiatives, ainsi que d'autres, favorisent la création d'une communauté savante autochtone dans l'Arctique.

C'est en 1979 que nous avons achevé les études sur l'articulation des activités scientifiques au Yukon et dans les T.N.-O., en jetant ainsi les premières fondations de l'Institut scientifique des T. N.-O.

En raison de toutes ces initiatives et d'autres encore, les auteurs du Rapport publié ce soir ont fait la synthèse d'un ensemble d'études nordiques fort différent de celui qui existait il y a seulement une dizaine d'années, lors de la création de l'AUCEN.

Certains ont pu dire qu'il y a aujourd'hui plus d'universités s'occupant d'enseignement et de recherche nordiques qu'il n'y avait d'étudiants des 2e et

3e cycles oeuvrant dans les T. N.-O. au cours des années 1950. Il est possible que cette assertion soit un peu extrême, mais elle n'en met pas moins en évidence la réalité d'un développement foudroyant des études nordiques.

On observe actuellement une expansion véritablement remarquable des activités de recherche dans le Nord canadien. Le Rapport nous offre une autre occasion d'orienter et d'approfondir ces activités.

J'espère bien que le secteur universitaire canadien saura au moins saisir les possibilités offertes par le Rapport en matière de développement du Nord et des études nordiques.

À l'occasion du dixième anniversaire de l'AUCEN, je veux mettre en relief l'action de l'Association et de ses universités membres en faveur du progrès des Études canadiennes dans et sur le Nord, et aussi signaler les efforts de la Direction des Affaires scientifiques et circumpolaires du Ministère des Affaires indiennes et du Nord. Cette Direction ne constitue que l'un des rouages de la vaste administration de ce ministère, mais elle a mis sur pied, développé et protégé une série d'entreprises d'une remarquable diversité, qui sont importantes pour tous les participants à notre Rencontre. Je ne mentionnerai, à titre d'exemple, que le Programme de formation scientifique dans le Nord, le Programme d'échanges circumpolaires, le Prix de la recherche scientifique sur le Nord, le réseau des stations de terrain nordiques et, bien entendu, l'AUCEN elle-même. On devrait attribuer la plus grande partie du mérite de leur mise en oeuvre à M. Donat Savoie et à ses collègues.

Enfin, j'applaudis à l'attention constante que le Groupe de travail accord à la perspective internationale, comme le prouve sa prise en considération des questions circumpolaires. Il se peut que vous ayez également remarqué l'emploi fréquent, par le Ministre, du mot "polaire" dans son allocution, et son utilisation occasionnelle des termes "polaire et arctique". Le Ministre entérinait ainsi l'attention spéciale que le Rapport porte aux affaires internationales du Sud polaire et du Nord polaire.

J'ai récemment accompli une série de visites universitaires aux établissements d'enseignement supérieur de huit pays différents. Cette expérience a renforcé ma conviction selon laquelle il faut partout éviter l'esprit de clocher et ses périls; les universitaires canadiens doivent, eux aussi, s'en détourner.

Sur le plan des études nordiques, comme le Rapport le souligne, notre pays fait face à une situation particulière. Par exemple, si la Principauté de Monaco voulait établir sa réputation en matière d'études polaires, comme elle l'a fait dans le passé, il lui suffirait d'organiser une expédition ou deux, de créer un musée spécialisé, de publier quelques ouvrages pertinents et de réunir une conférence internationale.

Mais le Canada se trouve dans une situation bien différente. C'est l'une des grandes nations polaires: ses responsabilités intérieures et circumpolaires sont énormes sur ce plan et doivent être assumées sans défaillance. Il nous est indispensable d'accomplir la multiplicité des tâches quotidiennes d'une nation dont le territoire et les citoyens sont nordiques ou polaires, selon tous les critères habituels. Ces responsabilités placent de lourdes charges sur les épaules des scientifiques, tout comme sur les autres secteurs

d'activité de notre société.

Bien entendu, ces obligations nous offrent aussi des possibilités, et nous proposent des défis fructueux qui n'existent guère pour Monaco. Par contre, la relative faiblesse démographique de notre vaste territoire septentrional risque d'épuiser les forces du pays à la résolution des problèmes nordiques intérieurs, ne lui laissant pas suffisamment d'énergie pour s'occuper des problèmes internationaux, sur les plans tant du Nord polaire que du Sud polaire.

Selon moi, en tant que scientifiques (ou même, si vous voulez, en tant que simples citoyens) d'un grand pays polaire, nous sommes moralement tenus d'apporter notre contribution à l'effort polaire international. Il nous faut partager nos connaissances et notre compétence particulière avec les autres peuples circumpolaires. À l'inverse, notre petit groupe de scientifiques luttant contre les difficultés suscitées par la grandeur du territoire nordique, et cherchant à tirer parti des possibilités qu'il offre, doivent s'étayer le plus largement possible sur les résultats des recherches internationales pour remplir leurs obligations tant intérieures que mondiales sur ce plan.

Le Rapport du Groupe de travail qui vous est présenté aujourd'hui par le Ministre constitue, selon mon opinion, un document de premier ordre. Il peut, en fait, nous indiquer les orientations préférentielles. La qualité, l'envergure et le dynamisme des recherches polaires accomplies au Canada sont des aspects importants tant pour les Canadiens que pour la collectivité internationale. Le Rapport offre la rare et précieuse possibilité de développer nos points forts et de mettre en évidence nos faiblesses, et nous permet d'envisager le futur développement de la base des connaissances sur lesquelles s'étayent les activités canadiennes dans l'Arctique et, en fait, la souveraineté même du pays sur ces territoires.

Je souhaite que vos débats sur cet important Rapport soient largement couronnés de succès.

Merci, Mesdames et Messieurs.

Addenda (Dir. de publ.)

Les ouvrages suivants pourraient intéresser les lecteurs de l'allocation de M. T.H.B. Symons:

Perspective boréale, Une stratégie et une perspective scientifique pour l'essor du Nord canadien, Conseil des sciences du Canada, Rapport n° 26, 1977.

La science et le Nord, Séminaire sur les principes directeurs des activités scientifiques dans le Nord canadien, Mont-Gabriel, Qué. Comité consultatif sur le développement du Nord, gouvernement du Canada, 1972.

Sixième conférence annuelle, Régina, Sask., Rapport 1983, Association universitaire canadienne d'études nordiques, Ottawa, Ont., 1983.

Se connaître, T.H.B. Symons, Rapport de la Commission pour les Études canadiennes, Association des universités et collèges du Canada, Ottawa, 2 vol., 115 pp., 1975.

THE ARCTIC RESEARCH AND POLICY ACT OF 1984 AND ITS IMPLICATIONS FOR U.S. ARCTIC RESEARCH*

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*Modified and in part verbatim from author's paper "Science trends in the Arctic" to be published in the University of Virginia's Oceans Policy Study Series as a contribution to the University's Center for Oceans Law and Policy Seminar on the Polar Regions, held in Charlottesville, Va., 26-28 March 1987

Introduction

Mr. Chairman, President Tremblay, Dr. Adams, Ladies and Gentlemen: I am honored to be here to help celebrate the Tenth Anniversary of the founding of the Association of Canadian Universities for Northern Studies.

Since most of my own research since 1937 has been in Arctic Canada and continues there, I feel very close to your scene of action. I am proud to wear the new pin of the Polar Continental Shelf Project, which Mr. Hobson gave me yesterday, since Tahoe and I call Resolute and Cornwallis Island our second home.

Even though my topic here centers on U.S. arctic research, search for knowledge is universal. Many of the scientific problems facing the arctic-rim nations are similar, and I am a strong proponent for international cooperation in such research to our mutual benefit. Cooperation, formal and informal, with recognition of appropriate areas for emphasis is in all our interests, and nowhere is such cooperation closer to my heart than between Canada and the United States. I personally owe much to Canada and many Canadian colleagues, some of them here, for contributing to my own research interests and activities.

The Arctic Research and Policy Act of 1984

Let me turn to my subject: "The Arctic Research and Policy Act of 1984 and its Implications for U.S. Arctic Research". In doing so I shall be wearing my own hat, not that of the U.S. Arctic Research Commission, "mais je pense que les deux chapeaux portent presque la même couleur".

The Act (U.S. Congress, 1984), sponsored by Senator Frank Murkowski of Alaska, promises to be an important landmark in the future of U.S. arctic research. Passage of the Act reflected a growing awareness of the geopolitical, defense, economic, and other arctic issues (Westermeyer and Shusterich, 1984; Young, 1986) affecting the United States, against a background of lack of U.S. policy and continuity in arctic research in prior years (Hickok et al., 1981; Polar Research Board, 1982).

The Act, perhaps not surprisingly in view of its Alaskan background and for its purposes, arbitrarily expands the definition of the Arctic with respect to Alaska to include the Bering Sea and the Aleutian Chain.

> "... the term 'Arctic' means all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain" (U.S. Congress, 1984, Sec. 112).

The Act focuses on national research needs. The principal driving forces are spelled out in the Act. Thus its purposes are:

> "(1) to establish national policy, priorities, and goals and to provide a Federal program plan for basic and applied scientific research with respect to the Arctic, including natural resources and materials, physical, biological and health sciences, and social and behavioral sciences ...." (U.S. Congress, 1984, Sec. 102(b)).

To help implement these objectives, the Act established two bodies - the Arctic Research Commission and the Interagency Arctic Research Policy Committee. The Commission, whose responsibilities are primarily advisory, consists of five presidentially appointed members, three from the research community, one from industry, one from the Native community, and the Director of the National Science Foundation (ex officio).[1]

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[1]The members of the Commission are Dr. James H. Zumberge (Chairman), Mr. Oliver Leavitt, Mr. Elmer E. Rasmuson, Dr. Juan G. Roederer, Dr. A. Lincoln Washburn, and Dr. Erich Bloch (ex officio).

The Committee is the executive arm of the Act and currently represents (with observers) 13 federal agencies concerned with arctic research, namely: The National Science Foundation, the Departments of Commerce, Defense, Energy, Interior, State, Transportation, Health and Human Services, the National Aeronautics and Space Administration, the Environmental Protection Agency, the Office of Science and Technology Policy, the Office of Management and Budget (Observer). The NSF serves as chair agency.

The Commission and the Interagency Committee report independently, the Commission to the President and Congress, and the Committee to the President but only through the President to Congress. The fact that the Commission reports directly to Congress as well as to the President considerably enhances the Commission's powers of persuasion.

U.S. Arctic Research Policy

The present U.S. Arctic research policy as recommended by the Commission and refined by the Interagency Committee states:

> "U.S. Interests - It is in the national interest of the United States to support scientific and engineering research to implement its national

policy of protecting essential security interests, promoting rational development of the Arctic region while minimizing adverse environmental effects, and contributing to the knowledge of the Arctic environment or to aspects of science which are most advantageously studied in the Arctic. Where appropriate, this research should be coordinated with the efforts of state and local government and the private sector. The research should be carried out in a manner which benefits from and contributes to mutually beneficial international cooperation. Arctic Research policy is subject to periodic review and revision.

U.S. Goals and Objectives in Arctic Research - Arctic research shall be aimed at resolving scientific and technological problems concerning the physical and biological components of the Arctic and the interactive processes that govern the behavior of these components. The objectives include addressing the needs for increased knowledge in such issues as: the Arctic as a natural laboratory, national defense, natural hazards, global climate and weather, energy and minerals, transportation, communications, renewable resources, pollution, environmental protection, health, adaptation and native cultures."

To achieve these goals and objectives, research (and its support) will focus on:

"National Security - Environmental phenomena and processes relating to defense; human health and biology in the Arctic; high latitude communications; and Arctic marine technology."

"Rational Development with Minimal Environmental or Adverse Social Impact - Arctic marine technology, relating to commercial vessels, transportation systems and offshore operations; collection and long-term monitoring of baseline data on relevant parameters for cumulative environmental impacts; environmental, health, behavioral, and societal aspects of development; sea state, ice reporting and weather forecasting."

"Scientific Research on Arctic Phenomena and Processes and Aspects of Science Best Studied in the Arctic - Systematic collection of basic data related to physical, biological, materials, social, cultural, health and behavioral phenomena and the establishment of an Arctic data and information system; effects of Arctic conditions on global climate and weather; effects and migration of pollution on global climate and weather patterns; and preserving and conserving wildlife and essential habitats (Interagency Arctic Research Policy Committee, 1987)."

I expect many of these concerns may sound familiar.

The Arctic System and Research Priorities

Research priorities as recommended by the Commission (U.S. Arctic Research Commission, 1986; 1987) stress fundamental knowledge of the arctic system, whose interacting, coupled components comprise the arctic atmosphere and its extension into the magnetosphere, the Arctic Ocean (including its marginal seas, sea ice, and sea bed), the arctic land, and the biota including man.

The priorities relating to the natural environment are, in order of priority, (1) research to understand how the Arctic Ocean and atmosphere operate as coupled components; (2) similarly, research to understand how the land and atmosphere operate as coupled components; and (3) research to understand the high-latitude upper atmosphere and its extension into the magnetosphere. The Commission believes improved knowledge of these interactions is urgently required to meet the goals and objectives cited earlier, including those in the health, socioeconomic, and cultural areas. The basic and applied science problems themselves are legion (Washburn and Weller, 1986).

Much of the needed research bearing on the health, culture, and socioeconomic concerns of arctic residents is truly of national and international import and transcends purely regional responsibilities. Illustrations are circumpolar problems in public health and in medicine that are peculiarly arctic in some respects but are also more general in their implications (Fortuine, 1984; Polar Research Board, 1982), and the effects of resource development, industrialization, and urbanization on indigenous peoples and the environment (Berger, 1985; Rosing, 1986). Therefore the Commission also recommended a national priority category distinct from the others by its nature but parallel and of comparable high priority "...to identify and resolve the major health, behavioral, and cultural problems derived from the distinctive characteristics of the Arctic environment and from increasing resource development, industrialization, and urbanization" (U.S. Arctic Research Commission, 1986, p.17).

Five-Year Arctic Research Plan

Both the Commission and the Interagency Committee cooperate closely in one of their most important duties, the preparation of a biennially updated five-year Arctic Research Plan that incorporates an overview of the federal budget for basic and applied research of a nonclassified nature.

The U.S. Arctic Research Plan (Interagency Arctic Research Policy Committee, 1987) is based on agency programs, public input, and the broad Commission recommendations regarding priorities, as refined by the interagency Committee following additional public review. This will be the first time that the U.S. Government has embarked on a comprehensive Arctic Research Plan. The initial Plan, which shows a total fiscal 1988 budget of about $95 million for all agencies, provides an overview of arctic research and its rationale. Implementation of the Plan will go far towards assuring that undesirable overlaps in research are avoided and that critical gaps are not overlooked. While far from perfect, the Plan is a credit to the hard work of the Interagency Committee and to interagency cooperation.

Implications for U.S. arctic research

The Arctic Research and Policy Act has helped to set the stage for the future of U.S. arctic research, but the research itself is budgetarily restricted and like all research is subject to competing demands. Agreeing on national research priorities, aside from broad guidelines, faces various pressures affecting the five-year Arctic Research Plan and the future directions of research.

Federal agencies have specific missions, and agency representatives are unlikely to agree on overall research priorities that would reduce their individual mission budgets in favor of competing priorities in other agencies. Thus the five-year Arctic Research Plan can be expected to stress cooperative efforts of interest to several agencies and perceived gaps in ongoing programs, rather than trying to prioritize research efforts between different agencies, or specific agency research beyond what agencies do internally with respect to their own programs. This approach has the benefit of assuring that important research is not overlooked and permits the Interagency Committee to work in a cooperative and mutually beneficial manner.

Identification of critical gaps and the prioritization where possible of broad, cooperative programs should stimulate new approaches and justify the necessary funding to accomplish the recommended research while meeting mandated agency responsibilities for mission-related priorities and normal budgetary procedures. At the same time, the Commission, in its independent and direct reports to Congress as well as to the President, is duty bound to make carefully considered overriding recommendations concerning federal arctic research programs, regardless of other considerations, if the Commission deems it is in the national interest to do so. However, most of the recommendations of the Arctic Research Plan as recently reviewed by the Commission and adopted by the Committee are quite consistent with the broad priorities recommended by the Commission.

A further consideration relating to research priorities and future science trends is that basic and applied science programs tend to compete for attention and money. Again this is quite normal. Relative priorities depend in part on short- vs. long-term needs in which anticipated immediate applications are more likely to find taxpayer and political favor than long-term needs that may be more significant for the nation's welfare. It can be argued that business and industry should constitute a major force in translating research into development of practical applications, leaving long-term research for government and philanthropic support (cf. Press, 1987, p. 50), but political realities of government tend to emphasize the more immediate rather than the more remote. There is no easy resolution to such matters except informed cooperation, especially between basic and applied science programs. The National Science Foundation is furthering such cooperation by generating joint federal-industrial support in appropriate areas of science to include engineering research and establishment of science and technology centers (Bloch, 1987; Walsh, 1987). Wise counseling by both the Arctic Research Commission and the Interagency Committee will help to maintain a balance between long-term and short-term research.

Still another consideration arises in that national priorities may not support or may even conflict with state and regional priorities as has sometimes been the case with respect to policies in administrating federal and state lands in Alaska. In an attempt to further cooperative efforts where interests coincide, former Governor Sheffield of Alaska and the Commission recommended designation of joint federal-state task forces in (1) data handling and information systems, (2) Bering Sea fisheries ecosystem research, and (3) health research. All three efforts are now underway, and several others may be developed in the future (U.S. Arctic Research Commission, 1987).

Other matters that will influence the future of arctic research include increased emphasis on remote sensing and on automated ground stations to gain real-time information over far larger areas than can be efficiently accomplished by field parties. But field research has its unique capabilities in that ground-truth requirements, site-specific investigations, and other detailed work will always make field research indispensable.

Improved logistic support is needed. At the present time the United States is without a polar research vessel dedicated to arctic work, whereas the Soviet Union leads the world in the number of such vessels (Elsner, 1985). The Commission is also reviewing other logistic needs, whether air, sea, or land based. A model frequently commended for some purposes is the one so effectively employed by Canada's Polar Continental Shelf Project under both Mr. Hobson and his predecessor, Dr. Roots.

Also, as opposed to the prevailing emphasis on the natural sciences by most U.S. government agencies engaged in arctic research, indigenous peoples of Alaska and elsewhere are now requesting and will increasingly press for research in the social sciences. This is going hand in hand with demands for involvement of indigenous peoples in arctic research generally, including its management. Their heritage in the land and its resources and in the living resources of the sea, and the increasing political influence of arctic-rim indigenous peoples will assure continuation of this trend (Brewer and Stotts, 1984; Fry, 1984; Rosing, 1986). At present most U.S. federal and Alaska state agencies are ill equipped to deal with such questions, but sharper agency focus on them is bound to come.

Certain other trends bearing on the future of U.S. arctic research are also coming to the fore. System concepts and mega research problems are receiving increased support as witness the proposed international Geosphere-Biosphere Program (National Academy of Sciences, 1986) and the recent announcement of the National Science Foundation's Global Geosciences program (Eos, 1986). Such programs entail an increasingly widespread requirement for interdisciplinary approaches. Many developments in arctic research itself, as exemplified by the concept of the Arctic as a complex interacting system, promote this trend and will help to keep a focus on long-range needs. Such developments should also promote cooperative research efforts, both nationally and internationally.

As noted earlier, weather and climate prediction are among the leading driving forces for arctic research. Because of projected increases in carbon dioxide and other greenhouse gases, it is believed our globe may undergo a climate warming of some 1°-5°C by the middle of the next century; given such a warming, it will almost certainly be first felt and greatest at high latitudes (Dickinson and Cicerone, 1986, p.6; United Nations Environmental Program/World Meteorological Office/International Council of Scientific Unions, 1985). This temperature rise could be sufficient to have some potentially highly important, but quantitatively speculative, effects (MacCracken and Luther, 1985; Polar Research Board, 1985), including reduced sea ice and increased navigation in the Arctic Ocean; thawing of some permafrost; and melting of glaciers with consequent rise of world sea level that, depending on the amount of rise, might have serious consequences along low-lying coasts.

The potential warming, the fact that high latitudes are especially sensitive indicators of climate change and that global weather and climate in turn are sensitive to changes in the arctic atmosphere (Polar Research Board, 1984, p. 18-26) have focused considerable attention on arctic weather and climate. This focus is likely to increase if further research tends to support the computer modeling on which the present projections are largely based. A recent study of permafrost temperature profiles in northern Alaska appears to confirm a warming trend of 2 to 4°C within the last century (Lachenbruch and Marshall, 1986).

With respect to natural resources, although U.S. oil and gas exploration is currently in a decline, there is a considerable body of opinion that the decline is temporary and there will be an upturn to meet future requirements for more domestic oil. The projection is primarily based on dwindling supplies and the need to reduce U.S. dependence on foreign oil. The price of oil, recently up to $18/barrel and then down again (Daniels, 1987a), then topping $19/barrel (Daniels, 1987b), is clearly subject to fluctuations. A high enough price would stimulate renewed economic incentive for exploration and the development of new oil resources. A significant degree of self sufficiency would help protect the U.S. against world market manipulations (Crawford, 1987; Herschel, 1987; Hirsch, 1987; Murkowski, 1987; U.S. Interior Secretary Hodel, cited in Connelly, 1987).

The present interest in possible oil development in the Arctic National Wildlife Refuge in Alaska (ANWR) is based on such considerations and ANWR's potential, unproved by available drilling results, for perhaps being a second Prudhoe Bay. The upcoming Congressional debate over opening the critical ANWR Coastal Plain area to full leasing and hence exploration and development, as recommended by Secretary of the Interior Hodel (U.S. Department of Interior, 1987, v. 1, p. 188-192), promises to be an intensely emotional issue that will highlight partisan positions between resource development and environmental protection. Of course, the ANWR issue will affect not only the U.S. Arctic but also Canada in that the wildlife do not recognize international boundaries, and the migrating caribou of the region, the Porcupine caribou herd some 180,000 strong, are a responsibility of both countries. The concern is increased because the herd calves in the Coastal Plain area and the herd's welfare is critical to the indigenous peoples of both countries.

In order to assess U.S. natural resources, it would seem prudent and in the national interest to determine whether or not a world-class oil resource is, in fact, present. Congressional decisions needed to accomplish this would include approving either exploratory drilling without leasing, or full or limited leasing of the Coastal Plain area for exploration and development; other possible options are maintaining the status quo or designating the entire area as wilderness as advocated by Representative Udall, Chairman of the House Interior Comittee, who is sponsoring legislation to this effect. If leasing becomes the preferred decision in the U.S. national interest, this interest would also require that the environment, including its wildlife, be as fully protected as possible.

The best science available is needed to bear on these questions and their long-range implications. Significant baseline data have been assembled (Garner and Reynolds, 1986), and important evidence presented (U.S. Department of the Interior, 1987, v. 1-2). Impartial evaluation of this information and

of any other evidence by a highly qualified, independent scientific body, supplemented by further research if necessary, could assure availability of the best information to help resolve conflicting views and provide the unbiased, high-quality analysis required for informed decisions.

Defense considerations have become a major driving force in arctic research (Johnson, Bradley, and Winokur, 1984), and are likely to maintain their impact. Considerable defense work is of course classified, and the Commission as such is not privy to it nor is classified research represented in the five-year Arctic Research Plan. However, defense considerations obviously support, and benefit from, much of the unclassified research - and to some extent vice-versa.

There are also international territorial issues concerning the Arctic Ocean that complicate matters (Shusterich, 1984). Thus, contrasted with Antarctica where conditions have permitted the Antarctic Treaty to put such difficulties on hold, at least temporarily, the situation in the geopolitically sensitive Arctic is much more complex as pointed out by Fred Roots (1984). Nevertheless, despite these complications, all far-northern nations, especially the arctic-rim countries, have much to gain from cooperation where research interests coincide. Efforts to promote such cooperation are being strongly supported by the U.S. Arctic Research Commission (1987), and hopefully will become increasingly productive.

Federal, state, industrial, and academic institutions are all involved in the future of U.S. arctic research. Much thought is now being given to it, as witness passage of the Arctic Research and Policy Act itself; the considerable effort that has now gone into the five-year Arctic Research Plan by the Interagency Arctic Research Policy Committee and others; and a very timely National Science Board review of the NSF role in the polar regions. This review devoted quite a bit of time to arctic research, as well as to the Antarctic for which the NSF has a special mandate. The report is due later this year.

Of the communities involved in the future of arctic science, the academic community, although overall commonly the least well funded, has traditionally been the most productive of new research insights. This trend will probably continue. The influence of the U.S. academic community might be even greater were its arctic research centers to organize as a consortium or find other means to promote cooperative research efforts, as the Association of Canadian Universities for Northern Studies is now doing in Canada and for which a national focus would be provided if the newly proposed Canadian "Polar House" concept is approved (Canada and Polar Science, 1987, p. 108-111). It has been informally suggested that a U.S. nongovernment but possibly government-aided cooperative research entity could do much to enrich and further the future of U.S. arctic research, perhaps in conjunction with a more unified government focus than now exists for assisting logistics.

Through passage of the Arctic Research and Policy Act, the United States has at long last recognized its position and its responsibilities as an arctic nation. Research will of necessity continue to be an important part of these responsibilities. Because of the importance of the Arctic in many different ways an upward trend in U.S. arctic research seems probable, although the effect of the five-year plan remains to be seen. As the landmark report of

the Roots Committee, Canada and Polar Science, and this Conference amply demonstrate, research interest is also increasing in Canada. The same seems to be true of other northern countries. Surely this provides a timely opportunity where appropriate to further international cooperation in advancing arctic research to the benefit of science and mutual interests.

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CANADA AND POLAR SCIENCE

Report to the Minister of Indian Affairs & Northern Development, March 1987

EXECUTIVE SUMMARY

1. In September 1985, at the Arctic Policy Conference at McGill University, Montréal, the Minister of Indian Affairs and Northern Development invited the authors to consider and report to him on the advisability and feasibility of creating a National Polar Institute for Canada. In response we solicited opinions and suggestions from a wide range of interested persons, institutions and agencies in the private sector, in universities, and in the federal, provincial and territorial governments. We reviewed the history and development of polar sciences in Canada, and investigated the institutional structures and responsibilities for polar research in other countries.

2. There exists in Canada a large number of public and private institutions involved wholly or to some degree in the fields of northern science, northern research and the development of polar technologies. More than twenty federal departments and agencies, over thirty Canadian universities, numerous industrial organizations, several provincial and the territorial governments, as well as northern native development corporations and private organizations in both northern and southern Canada are engaged in some aspect of the development or application of knowledge pertaining to the Canadian North. One body, the Arctic Institute of North America was created by an Act of Parliament in 1945 to serve as a national arctic institute, but it has not operated as such for several years.

3. These institutions support a broad range of scientific and research activities in the Canadian North, in the international North and, to a limited extent, in the south polar regions. Canada has developed internationally recognized expertise in many individual areas of northern scholarship and research, and in some areas of polar technology development we lead the world. Several schemes exist to support and train students in northern science. The Working Group did not find any evidence to support the simple assertion that there are not enough institutions or individuals engaged in polar research in Canada.

4. Despite the number and diversity of the institutions and individuals engaged in polar research, the Working Group found an acute and pervasive sense of dissatisfaction within the polar research community respecting the collective quality, relevance and coherence of polar research in Canada. There are many areas of northern and polar knowledge of importance to Canada where our scientific activities and expertise are weak, and some of the research we are carrying out is not effective. Dissatisfaction is felt equally strongly by those groups who seek to benefit from the results of polar research, including northern residents, industry and national policy-makers.

5. Many scientists and researchers engaged in polar research in Canada work in relative isolation, or feel that they are ignorant of the activities of their colleagues. Northern scientists in Canada are often expected to be general experts on the North, yet they are often poorly informed about general northern developments outside of their fields of expertise, and about polar research activities outside of Canada.

6. Most private and public Canadian institutions and agencies formally engaged in polar research are small and depend upon one or two key individuals for their initiative and effectiveness. The institutional diversity of Canada's polar research community is, in many ways, an asset; nevertheless, there is a serious, debilitating, lack of contact, co-operation and interaction among the members of the Canadian polar research community. In many subject areas, the quality, maturity and sophistication of Canadian research in the polar regions suffers as a result of the absence of a "critical mass" of expertise necessary to generate first-class science and research.

7. The direct and indirect support by the federal government of polar science and research has declined in net terms since the early 1970's. During this period, the federal government appears to have re-directed much of its support from long-term, sustained research and systematic data-gathering to the resolution of urgent short-term policy and political problems associated with non-renewable resource development or surveillance for defence. There is a chronic shortage of funds to support polar research in Canada, and there has been a serious decline in the infrastructure (libraries, information systems, research stations) needed to support such activities. This has compromised the sophistication, competitiveness and creativity of Canadian polar research.

8. There is little evidence of any collective sense of purpose or direction within the federal government as a whole respecting the promotion, support and undertaking of activities to increase knowledge of the polar regions.

9. The lack of cohesion with regard to polar responsibilities within the federal government and the remoteness of the polar research community from decision-makers in government contribute to much inefficiency in Canadian polar research. Among the consequences have been simplistic and inconclusive "short-order" science and research, and a collective national research effort that is often far removed from the development of policies and the implementation of national objectives in the polar regions. In this respect Canada compares unfavourably with other polar nations.

10. There are many views within and outside of the federal government as to what the role of the federal government should be in polar research in Canada, and little consistency of linkage between the support of research, the research results and government policies affecting the North. The Working Group concludes that, as the forces driving Canada's needs for knowledge of the polar regions in the coming years are not likely to be mainly economic, but **are** likely to be of national as well as of regional or local concern, there is no body other than the federal government in Canada with the capacity or mandate to ensure that the necessary research is undertaken.

11. Although the lack of financial support for specific northern studies is unfortunate, the past failure of federal governments to **sustain** their commitments to polar research and to maintain consistent policies respecting the need for, and growth of, knowledge of northern and polar regions is the most serious single cause of the deterioration of polar research in Canada and the basic facilities and expertise needed to support such research. The political and administrative horizons of federal governments in the North have been too short and too fragmented to sustain a commitment to the long-term studies needed to obtain the thorough polar knowledge that will be needed in the coming years.

12. Canada no longer has an outstanding, comprehensive, up-to-date polar library, nor does it have a comprehensive, modern, multi - disciplinary information system supporting polar research activities. It does not have a systematic repository of information on polar research outside of Canada. It does not have a point of contact for Canadian polar scientists, for northern Canadians, the general public and the international polar research community. It does not have an institution or body mandated to be a source of publicly accessible information on the Canadian North and other polar regions. It is particularly difficult for northern residents to obtain reliable information about polar regions and activities. These are serious, glaring omissions in our national polar science structure that affect the quality of polar research in Canada and the level of knowledge and interest in polar matters among the people of Canada.

13. In the past, most science and research in the Canadian North has been undertaken or sponsored in a spirit of discovery and exploration, to address or respond to the challenges of resource development, or for military reasons. In future years, the issues driving Canadian needs for knowledge in the polar regions will be: the enhancement of Canadian sovereignty; national security; social and economic pressures on a rapidly growing northern population; arctic and global environmental quality; changes in wildlife habitat; the assumption of greater political authority by northerners; the concerns of non-northern public interest groups; and the need to have scientific knowledge from polar regions to address national and global problems.

14. The priorities, goals and methodologies of science in the polar regions are changing rapidly, along with changes in world science. Scientific knowledge important to the local or national issues of the North cannot be obtained through studies in northern regions alone. Research in the polar regions is an essential part of major regional and global research programmes in the physical, biological and human sciences. New technologies have particular application to research in northern and polar areas, and personal computers and advanced information systems make data and results accessible to northerners as well as scientists throughout the world. The natural characteristics of the polar regions and the nature of northern issues mean that important science is interdisciplinary and international to a greater degree than that in most regions of the world. Modern science in the Canadian North must be more quantitative, technology-oriented and integrated with science elsewhere, and at the same time more directly involved with, or part of, local concerns. The existing Canadian systems of support and priority-setting for northern research have not kept pace with these revolutions in polar science.

15. The protection of Canadian sovereignty in the Arctic will be aided by ensuring that we have sufficient scientific and technical knowledge and capability to anticipate, meet and respond to possible challenges, and by maintaining a general international reputation as a world leader in polar science.

16. At the same time that Canada's support for polar research appears to be declining, the support for polar research in other Arctic and sub-Arctic nations such as the U.S.A., Germany, Norway, Japan and Sweden is increasing. These countries are developing new, co-ordinated polar science programmes, often with substantial investments in modern facilities and technologies. While definitive comparisons are difficult to make, there appear to be

closer working relationships between the polar research communities in these nations and decision-makers in their respective governments responsible for defining and attaining national objectives in the polar regions. These countries appear not to be motivated mainly by the hope or promise of short-term economic gain in the polar regions. Canada's participation in international scientific co-operation in the polar regions is sporadic and under-funded in comparison with that of other nations, and our failure to sustain a comparable effort and to participate in co-operative activities with these nations compromises our self-assertion and influence as an Arctic nation.

17. Canada is the only northern polar nation that does not adhere to the Antarctic Treaty nor participate formally in scientific investigations in Antarctica, and this presents a handicap for Canada's own northern interests. It excludes Canada from the general scientific community of polar nations, and allows other countries to take the initiative in setting priorities for international polar studies vital to the Canadian north.

18. Northern Canadians, particularly northern aboriginal people, are alienated from and resentful of much of the polar research that has been and continues to be conducted in northern Canada. The contribution of the polar research community to the resolution of the problems of northern society is insufficient and there is little sense of accountability to northerners by those supporting science or setting its priorities. Although research in the and human sciences is belatedly increasing, many northern residents remain suspicious of studies in which they are objects and not participants. Northern territorial governments and native corporations are beginning to establish and develop their own research bodies and activities, but most of these remain operationally and intellectually isolated from the mainstream of polar research in Canada.

19. Despite the laudable accomplishments of several individual scientists and researchers who have established a good rapport, the general attitude of northerners toward the Canadian polar research community is one of suspicion, alienation and resentment. The interest and commitment of northern society to much current polar research is slight or in some cases negative. The support of northern-based and indigenous research institutes, and other measures designed to increase the accountability to northern concerns of polar research in Canada should be priorities for any federal policies on polar research.

20. Problems as diverse and deep-seated as the fragmentation of polar research in Canada, the need for greater involvement of native northerners in polar research, and the challenge of increased international activity in polar regions do not lend themselves to a single solution. They cannot be addressed effectively by a single institution or authority. There is already in Canada a considerable number of institutions attempting to deal with these issues. What is needed is not another research institution, but changes that will support the institutions already in place and give their work increased effectiveness and coherence.

21. New Canadian structures are needed, not to undertake or manage research in the polar regions, but to support existing and emerging Canadian institutions engaged in polar research. These structures should be constituted to address specific needs not currently satisfied by the present situation and specific problems currently facing the Canadian polar research community.

22. Therefore, the Working Group recommends that :

a) steps be taken to create a standing Canadian Polar Research Commission, accountable to the Canadian government at a senior level and responsible for monitoring and reporting on the needs and progress of polar sciences and research in Canada, both governmental and non-governmental, for recommending steps to be taken by the federal government to improve the relevance and effectiveness of Canadian activities in polar science, and for facilitating international and domestic liaison and co-operation in polar research. The Commission should be composed of knowledgeable and experienced individuals from both in and outside government, and should include a substantial number of northern residents;

b) steps be taken to establish, in conjunction with the National Libraries and with provision for continuity, a comprehensive Canadian Polar Information System. The System should incorporate or support existing data and information systems, be compatible with national and international scientific data systems, and be easily accessible to northerners for practical use. The system should be a general repository of national and international information on the polar regions;

c) steps be taken to establish a physical institution in the National Capital Region, here called "Polar House", to serve as a tangible expression of, and public contact point for, Canada's polar and northern interests and to foster development of a cross-disciplinary "critical mass" of northern and polar expertise;

d) the federal government increase its efforts to promote the greater involvement of northern research institutions and northern Canadians in the determination of national priorities for polar research and the actual undertaking of polar research in Canada. Specifically we recommend increased financial and other support for northern institutions engaged in research activities in the North, the effective participation of northerners in national institutions concerned with polar research, and measures to facilitate the access of northerners and northern institutions to the Canadian Polar Information System;

e) a national polar science communications centre be established, as part of "Polar House" and drawing on the Canadian Polar Information System, to provide to the Canadian public and interested persons from other countries information about the Canadian North, the polar regions and Canadian polar science;

f) because of the increasing national and international importance of scientific knowledge of northern Canada and the polar regions, the federal departments engaged in scientific activities in the North give greater emphasis to their northern research, and co-operate with the Canadian Polar Research Commission in determining scientific priorities and the most effective scientific activities in their areas of responsibility.

W.P. Adams
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SOMMAIRE

1. En septembre 1985, lors de la Conférence sur la politique relative à l'Arctique qui se déroulait à l'Université McGill, à Montréal, le ministre des Affaires indiennes et du Nord canadien a invité les auteurs du présent document à examiner la possibilité de créer au Canada un institut national d'études polaires, et à lui faire rapport sur la question. Ayant acquiescé à cette demande, nous avons sollicité l'opinion et les suggestions d'un grand nombre de personnes, d'instituts et d'organismes privés, universitaires et gouvernementaux intéressés. Nous avons étudié l'histoire et l'évolution des sciences polaires au Canada et examiné les structures et responsabilités institutionnelles relatives à la recherche polaire dans les pays étrangers.

2. Au Canada, un grand nombre d'institutions publiques et privées travaillent, de près ou de loin, dans le domaine de la science, de la recherche et des technologies du Nord et des régions polaires. Plus de 20 ministères et organismes fédéraux, plus de 30 universités, de nombreux organismes industriels, plusieurs gouvernements provinciaux et territoriaux, ainsi qu'un certain nombre de sociétés de développement autochtones du Nord et d'organismes privés du Nord et du Sud travaillent d'une façon ou d'une autre à l'acquisition ou à l'application de connaissances touchant le Nord canadien. Un organisme, l'Institut Arctique de l'Amérique du Nord, a été créé, en vertu d'une loi du Parlement de 1945, en tant qu'institut national de la recherche sur l'Arctique, mais ne fonctionne plus en tant que tel depuis plusieurs années.

3. Ces institutions financent la réalisation d'un grand nombre d'activités scientifiques et de recherche dans le Nord canadien, dans le Nord international et, dans une faible mesure, dans l'Antarctique. Le Canada a acquis des compétences reconnues internationalement dans de nombreux secteurs de la science du Nord et de la recherche polaire, et, dans certains domaines de la technologie polaire, nous devançons le reste du monde. Il existe plusieurs programmes de formation des étudiants dans la science du Nord. Le Groupe de travail n'a trouvé aucune donnée permettant d'appuyer l'assertion selon laquelle il n'y aurait pas assez d'institutions ou de particuliers s'occupant de recherche polaire au Canada.

4. En dépit de la multiplicité des institutions et des particuliers engagés dans la recherche polaire, le Groupe de travail a perçu l'existance d'un grand mécontentement, au sein de la communauté scientifique spécialisée dans le Nord, relativement à la qualité, à la pertinence et à la cohérence générale de la recherche polaire au Canada. Il y a de nombreux domaines de la science polaire qui sont importants pour le Canada et dans lesquels nous ne faisons pas grand-chose, ou dont notre connaissance est limitée, alors qu'une partie de la recherche que nous effectuons par ailleurs est inefficace. Tout aussi mécontents sont les groupes qui veulent bénéficier des résultats de la recherche polaire, parmi lesquels les résidants du Nord, le secteur industriel et les responsables politiques nationaux.

5. Nombre de savants et de chercheurs s'occupant de recherche polaire au Canada travaillent dans un isolement relatif, ou estiment qu'ils ne sont pas tenus au courant des activités de leurs collègues. On s'attend souvent à ce que les savants spécialisés dans le Nord, au Canada, soient experts dans les questions touchant le Nord en général, mais ils sont souvent mal informés de

l'état général de la recherche polaire en dehors de leur spécialité ou à l'extérieur du Canada.

6. La plupart des institutions privées et publiques du Canada s'adonnant officiellement à la recherche polaire sont de petite dimension, et leur dynamisme, ainsi que leur efficacité, reposent sur un ou deux individus. Leur diversité est, sous bien des rapports, un avantage; néanmoins la communauté scientifique polaire canadienne souffre d'un grave manque de contact, de coopération et d'interaction entre ses membres. Dans de nombreux secteurs, la qualité, la maturité et la modernité de la recherche polaire pâtissent de l'absence de la "masse critique" de compétences qui est nécessaire pour que la science et la recherche soient de qualité supérieure.

7. Le chiffre net du soutien financier direct et indirect que le gouvernement fédéral fournit à la science et à la recherche polaire a diminué depuis les années 1970. Il semble que, depuis cette époque, le gouvernement fédéral ait réorienté une bonne partie de l'appui qu'il accordait auparavant à la recherche soutenue et à long terme et à la collecte systématique de données, vers le règlement de problèmes politiques et vers la détermination de principes urgents et à court terme liés à l'exploitation des ressources non renouvelables ou à la surveillance militaire. La recherche polaire, au Canada, souffre d'un manque de fonds chronique, et l'infrastructure nécessaire (bibliothèques, systèmes d'information, stations de recherche) s'est dégradée considérablement. La modernité, la compétitivité et la créativité de la recherche polaire canadienne s'en trouvent compromises.

8. Nous n'avons guère trouvé de raisons de penser qu'il y ait, au sein du gouvernement fédéral, une volonté concertée de promouvoir, de soutenir et de réaliser des activités permettant d'accroître notre connaissance des régions polaires.

9. L'absence de cohésion au sein du gouvernement fédéral en ce qui concerne les responsabilités polaires et le fait que la communauté scientifique spécialisée dans le Nord soit éloignée des personnes chargées des prises de décision gouvernementales, contribuent pour une bonne part à l'inefficacité de la recherche polaire canadienne. On a ainsi abouti, entre autres choses, à une "science rapide", et la recherche est rarement reliée à l'élaboration des politiques et à la mise en oeuvre des objectifs nationaux dans les régions polaires. Sous ce rapport, le Canada occupe une place défavorable en comparaison avec les autres nations polaires.

10. Les opinions varient souvent, au gouvernement fédéral et à l'extérieur de celui-ci, quant au rôle que le gouvernement devrait jouer dans la recherche polaire au Canada, et il y a peu de cohérence entre le soutien à la recherche, les résultats de la recherche et les politiques gouvernementales touchant le Nord. Le Groupe de travail, tenant compte du fait que les connaissances relatives aux régions polaires, et dont le Canada aura besoin au cours des prochaines années, ne seront probablement pas uniquement d'ordre économique, mais sans doute aussi d'intérêt national, régional et local, en est arrivé à la conclusion qu'il n'y a pas d'autre organisme, au Canada, que le gouvernement fédéral, qui ait la capacité ou le mandat permettant d'assurer que les recherches nécessaires soient entreprises.

11. Bien que l'absence d'un soutien financier destiné spécifiquement aux études nordiques soit regrettable, le fait que le gouvernement fédéral ait été incapable de déployer un effort soutenu en faveur de la recherche polaire et d'adopter des politiques cohérentes relativement aux besoins et au développement de la connaissance du Nord et des régions polaires, constitue en soi la cause la plus grave de la détérioration de la recherche polaire au Canada, ainsi que de la dégradation des installations et des ressources techniques fondamentales qui lui sont nécessaires. Les horizons politiques et administratifs des gouvernements fédéraux successifs ont été trop bornés et trop fragmentés, dans le Nord, pour soutenir les études à long terme nécessaires à l'acquisition des vastes connaissances polaires dont nous aurons besoin au cours des années qui viennent.

12. À l'heure actuelle, il n'y a plus, au Canada, de bibliothèque polaire globale et à jour, pas plus qu'il n'existe de système d'information global, moderne et multidisciplinaire à l'appui de la recherche polaire. Il n'y existe pas non plus de répertoire systématique des donnees relatives à la recherche polaire effectuée à l'étranger. On n'y trouve pas de point de contact pour les savants polaires canadiens, pour les Canadiens du Nord, pour le grand public et pour la communauté scientifique polaire internationale. On n'y voit pas non plus d'institution ou d'organisme mandaté, faisant office de source publique d'informations sur le Nord canadien et les autres régions polaires. Il est particulièrement difficile pour les habitants du Nord d'obtenir des information fiables sur les régions et sur les activités polaires. Il y a donc dans notre appareil scientifique polaire des lacunes criantes qui nuisent à la qualité de la recherche et limitent les connaissances que les Canadiens ont sur les questions polaires, ainsi que l'intérêt qu'ils y portent.

13. La plupart des activités scientifiques de recherche relatives au Nord canadien ont été jadis entreprises dans un but de découverte ou d'exploration, avec l'intention de mettre en valeur les ressources, ou encore pour des motifs militaires. À l'avenir, les facteurs qui rendront nécessaire, pour les Canadiens, l'acquisition de connaissances sur les régions polaires seront les suivantes: renforcement de la souveraineté canadienne; sécurité nationale; pressions sociales et économiques exercées sur la population du Nord, de plus en plus nombreuses; qualité de l'environnement dans l'Arctique et en général; changements qui se produisent dans les habitats de la faune; acquisition de pouvoirs politiques accrus par les gens du Nord; préoccupations des groupes d'intérêt public du Sud; et enfin, nécessité d'avoir des connaissances scientifiques sur les régions polaires pour régler divers problèmes nationaux et internationaux.

14. Les priorités, les méthodes et les objectifs de la science relative aux régions polaires évoluent rapidement, tout comme ceux de la science en général. Les connaissances scientifiques d'intérêt local ou national touchant le Nord ne peuvent être obtenues par des études réalisées dans les seules régions nordiques. La recherche concernant les régions polaires est maintenant une des composantes essentielles des grands programmes de recherche en sciences physiques, biologiques et humaines. Certaines technologies nouvelles s'appliquent particulièrement à la recherche dans les régions nordiques et polaires, et les ordinateurs personnels, ainsi que les systèmes d'information avancés, rendent les données et les résultats accessibles aux habitants du Nord, de même qu'à toute la communauté scientifique internationale. Les

caractéristiques naturelles des régions polaires et la nature des questions relatives au Nord font que cette science importante est interdisciplinaire et internationale dans une mesure bien plus grande que toutes les autres. La science moderne, dans le Nord canadien, doit être quantitative, d'orientation technologique et reliée aux activités scientifiques qui se déroulent ailleurs, tout en étant plus proche des préoccupations locales. Les systèmes canadiens actuels de soutien et d'établissement des priorités de la recherche nordique n'ont pas évolué au même rythme que la science polaire.

15. La protection de la souveraineté canadienne dans l'Arctique sera facilitée si nous faisons en sorte d'avoir les connaissances et les ressources scientifiques et techniques permettant d'anticiper sur l'avenir et de prévenir les problèmes, et si, par ailleurs, nous pouvons acquérir une réputation internationale de spécialistes en science polaire.

16. Au moment même où le soutien accordé par le gouvernement du Canada à la recherche polaire semble diminuer, l'appui donné à ce type de recherche par d'autres nations arctiques ou subarctiques telles que les États-Unis, l'Allemagne, la Norvège, le Japon et la Suède, augmente. Ces pays mettent au point de nouveaux programmes coordonnés de recherche polaire, comportant souvent des investissements substantiels dans des installations et des technologies modernes. Bien qu'il soit difficile de faire des comparaisons précises, il semble que les relations de travail, dans ces contrées, entre la communauté scientifique polaire et les responsables politiques qui sont chargés de la définition et de la réalisation des objectifs nationaux dans les régions polaires, soient plus étroites qu'au Canada. Il semble que ces pays ne soient pas seulement mus par l'espoir de bénéficier de retombées économiques à court terme dans les régions polaires. La participation du Canada à la coopération scientifique internationale dans les régions polaires est sporadique et sous-financée, si on la compare à celle des autres nations, et le fait de ne pas soutenir un effort semblable au leur et de ne pas participer à des activités coopératives avec elles sape notre prétention à être une nation arctique et à avoir une influence en tant que telle.

17. Le Canada est la seule nation polaire du Nord qui n'ait pas adhéré au Traité sur l'Antarctique ni participé officiellement à des études scientifiques dans l'Antarctique, ce qui constitue pour nous-mêmes un handicap dans le Nord. En effet, le Canada se trouve ainsi exclu de la communauté scientifique des nations polaires, et laisse aux autres nations le soin de définir les priorités dans le contexte des études polaires internationales,essentielles au Nord canadien.

18. Les Canadiens du Nord, en particulier les Autochtones, sont restés à l'écart d'une bonne partie des activités scientifiques réalisées dans le Nord canadien, et pour cette raison, son mal disposés à l'égard de la recherche dans ce domaine. La communauté scientifique polaire n'a pas contribué suffisamment au règlement des problèmes de la société du Nord, et les personnes qui financent la science polaire ou en définissent les priorités n'ont guère le sentiment d'avoir des responsabilités envers les gens du Nord. Les recherches se multiplient dans les domaines des sciences sociales et humaines, et de nombreux résidants du Nord voient toujours d'un oeil suspicieux des études dont ils sont l'objet et auxquelles ils ne participent pas. Les gouvernements territoriaux et les sociétés autochtones du Nord commencent à

mettre sur pieds leurs propres organismes et programmes de recherche, qui restent le plus souvent matériellement et intellectuellement isolés du grand courant de la recherche polaire canadienne.

19. En dépit des efforts individuels louables déployés par certains savants et chercheurs qui ont établi de bons rapports avec la population, l'attitude générale des habitants du Nord envers la communauté scientifique polaire est empreinte de méfiance, de mécontentement, et d'un certain sentiment d'aliénation. La population du Nord accorde peu d'attention à la recherche polaire actuelle, et cette intérêt est même parfois négative. Toute politique fédérale de la recherche polaire devra établir comme priorité le soutien des instituts de recherche autochtones et des instituts installés dans le Nord, ainsi que l'adoption d'autres mesures destinées à accroître le sens des responsabilités de la communauté scientifique vers le Nord.

20. Des problèmes aussi variés et profonds que la fragmentation de la recherche polaire au Canada, le besoin d'y faire participer davantage les Autochtones du Nord, et les problèmes posés par l'augmentation de l'activité internationale dans les régions polaires ne peuvent trouver de solution unique. Ils ne peuvent être réglés efficacement par un seul organisme ou par une seule autorité. Il existe déjà au Canada un nombre considérable d'institutions qui tentent de s'occuper de ces questions. Il ne faut pas créer un autre organisme de recherche, mais effectuer des changements de nature à renforcer les institutions existantes et à rendre leur travaux plus efficaces et plus cohérents.

21. De nouvelles structures sont nécessaires au Canada, non pour entreprendre ou gérer des recherches dans les régions polaires, mais pour appuyer les institutions canadiennes existantes qui s'adonnent à la recherche polaire. Ces structures devraient être conçues de façon à faire face aux besoins précis auxquels la situation actuelle ne répond pas, ainsi qu'aux problèmes particuliers qui se posent actuellement à la communauté scientifique polaire canadienne.

22. Par conséquent, le Groupe de travail recommande:

a) Que des mesures soient prises pour créer une commission canadienne de la recherche polaire, permanente, qui relève d'une haute autorité fédérale et qui soit chargée de contrôler les besoins et l'avancement des sciences et de la recherche polaires au Canada, tant gouvernementales que non gouvernementales, et de faire rapport à ce sujet, ainsi que de recommander au gouvernement fédéral les mesures à prendre pour améliorer la pertinence et l'efficacité des activités scientifiques polaires canadiennes, et pour faciliter la liaison et la coopération internationale et nationale en cette matière. La commission devrait se composer de membres réputés et expérimentés, provenant de l'intérieur et de l'extérieur du gouvernement, et devrait comprendre un nombre important de résidants du Nord;

b) Que des mesures soient prises pour établir, en conjonction avec les bibliothèques nationales et dans un but de continuité, un système canadien d'informations polaires. Ce dernier engloberait ou appuierait les systèmes d'information et de données existants, serait compatible avec les systèmes de données scientifiques nationaux et internationaux, et serait facilement accessible aux habitants du Nord qui voudraient en faire un

usage pratique. Ce système devrait constituer un répertoire général d'informations nationales et internationales sur les régions polaires.

c) Que des mesures soient prises pour créer de façon concrète, dans la Région de la capitale nationale, une institution, appelée "maison polaire", qui devrait constituer une expression tangible de l'intérêt du Canada pour le Nord et pour les régions polaires et un point de contact pour toutes les personnes susceptibles de s'y intéresser également, et qui serait chargée de travailler à l'accumulation d'une "masse critique" de connaissances multidisciplinaires sur le Nord et sur les régions polaires;

d) Que le gouvernement fédéral multiplie ses efforts pour faire participer davantage les institutions de recherche et les Canadiens du Nord à la définition des priorités nationales relatives aux recherches polaires et pour promouvoir la réalisation concrète d'activités de recherche polaire au Canada. Nous recommandons en particulier que soit augmenté le soutien financier ou autre, dont bénéficient les institutions du Nord qui s'adonnent à la recherche dans cette région; que soit augmenté le taux de participation des habitants du Nord aux activités des institutions nationales qui se consacrent à la recherche polaire; et que soient prises des mesures visant à faciliter l'accès, pour les gens et les institutions du Nord, au système canadien d'informations polaires;

e) Que soit créé un centre national de communication de la science polaire, dans le cadre de la "maison polaire" et avec l'aide du système canadien d'informations polaires, ayant pour mission de fournir à la population canadienne et aux étrangers intéressés des informations sur le Nord canadien, sur les régions polaires et sur la science polaire canadienne;

f) En raison de l'importance toujours croissante des connaissances scientifiques nationales et internationales sur le Nord canadien et les régions polaires, que les ministères fédéraux qui s'adonnent à des activités scientifiques dans le Nord mettent davantage l'accent sur la recherche relative au Nord, et collaborent avec la commission canadienne de la recherche polaire à la définition des priorités et des activités scientifiques qui seraient les plus utiles dans leur secteur de responsabilité.

W.P. Adams
P.F. Burnet
M.R. Gordon
E.F. Roots (président)

INFORMATION AND THE NORTH

L'INFORMATION ET LE NORD

INFORMATION AND THE NORTH

Introduction

The Northern and Offshore Information Resources Seminars were developed to encourage links between northern information specialists in Canada. In 1986, for the first time, the Northern and Offshore Information Resources Seminars were held in conjunction with the ACUNS/AUCEN annual conference and the papers presented at these meetings formed a substantial portion of the ACUNS/AUCEN 1987 publication 'Education, Research, Information Systems and the North'.

This year, at the Ryerson Conference a NOIR Seminar was again held in conjunction with the ACUNS/AUCEN meetings. The following papers were selected for publication because they deal with topics not covered in the 1987 publication.

NORTHERN AND OFFSHORE CLIMATE INFORMATION SYSTEMS

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Abstract

With the increased interest and activity in offshore hydrocarbon development in Canadian waters, demand for marine climatological data has increased over the past several years. Analyses of this data are needed for the safe, efficient, and economical design and operation of offshore structures and in decision making, planning, and policy development by both industry and government.

To meet this increased demand, the Canadian Climate Centre (CCC) of the Atmospheric Environment Service has developed a series of climate information systems to access and summarize its vast archive of marine environmental data in an efficient and cost effective way. These systems are interactive and menu driven to make them as easy to use as possible. Information systems developed so far are:

1) MAST (MArine STatistics) which allows access to and summary of the CCC's large archive of global marine ship and drill rig data.
2) CRISP (Climate for Research in Ice Software Package) which allows access to and summary of the CCC's archive of digital sea ice cover data.
3) CONAN (CONtour ANalysis) which allows mapping and contouring of climate data.
4) DUST (DUration STatistics) which allows duration and extreme value analysis of climate data.

All the systems initiate an interactive session by prompting the user to specify:

1) the area of analysis
2) the specific input data set to be analyzed, and
3) the time span of the analysis.

Additional information is asked based on each individual user's needs.

A study can be specified for any area of the world that the selected data base covers. Many of the data bases are global or hemispheric in extent. High quality graphical display of the data is a key factor in the utility of these systems since large volumes of data can be condensed into a simple representation.

These systems are widely used by the large oil companies, engineering consultant firms, and several Canadian government departments to meet design engineering needs, environmental impacts assessment needs, contingency planning needs and regulatory needs.

The costs of running the analyses are typically in the $150-300 range depending on the type and complexity of analysis performed. Users can either access and run their own information request interactively or can contact the appropriate regional AES office or the CCC who will analyze their request and do the analysis at an additional cost.

NORTHERN CONNECTIONS - A GLIMPSE OF THE FUTURE

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During the 25 years between 1961 when I myself joined the staff of the Arctic Bibliography for four years, and the 1986 Doonesbury cartoon typifying our involvement in the computerization of information storage and retrieval, many technological changes have occurred in the provision of information to the user. I would like to discuss where we go from here, specifically the provision of "northern information" and the future of northern information networking.

Although the Arctic Bibliography (AB) did not publish its final volume until 1975, collecting of materials for it ceased around 1971. That was, by coincidence, the year of the first meeting of the Northern Libraries Colloquy (NLC). This international group of northern information providers and users has met a total of eleven times since 1971. At virtually every one of these meetings, the participants have discussed the need for an international northern information network. I use the word network here to mean an information network - a [tele]communications link between a geographically dispersed group of libraries and information centers, for the purpose of sharing information resources among a wider audience. Much progress has been made toward the goal of a northern information network, and several elements of such a network now exist, as is amply evident here today. However, we have still not arrived at a solution to the central problem in the provision of such a network, namely, the lack of a mechanism to coordinate the many different centers providing bibliographic control over the "northern" literature. A network is dependent on cooperation among several information centers; a method is needed to administer and organize this effort.

Since I am one of the few attendees from the U.S., I have been asked to acquaint you briefly with the Arctic Research and Policy Act of 1984 (ARPA) and the Arctic Environmental Information and Data Center (AEIDC) project for "A National Arctic Information Network".

The Arctic Research and Policy Act of 1984

Among many other problems identified by the Arctic Research and Policy Act of 1984 (ARPA) is the problem of information management and transfer. Section 102 (a) 12. of the Act states that "better dissemination of research data and information is necessary to increase the efficiency and utility of national arctic research efforts" (Polar Research Board, 1985, p. 119). To achieve the goals and objectives in arctic research outlined in National Issues and Research Priorities in the Arctic (Polar Research Board, 1985), it is recognized that "Efficient compilation, cataloging, and preservation of data in all disciplines is needed for the Arctic on a regional basis" (Ibid., p. 115). In the 1986 Report of the U.S. Arctic Research Commission to the President and the Congress of the United States of America, it was recommended that "the following be given highest priority: Consolidation of an Arctic data and information transfer system and related management policy to facilitate

the storage and distribution of data ... ." (Report of the U.S. Arctic Research Commission ..., 1986, p. 4). The identified need for a national arctic information network is being addressed under a United States National Science Foundation sponsored grant, Design of a U.S. Arctic Information Network, by the University of Alaska - Fairbanks' Arctic Environmental Information and Data Center (AEIDC). The intent of this project is to identify and evaluate the existing elements for a network and propose ways to link them. The review draft of this project, entitled A National Arctic Information Network, has just been completed; the final report is due at the end of May. A national network plan has been developed, and we look forward to its publication.

The need for an international network for northern information

The need for an international network for northern information has been officially recognized by the U.S. government through the ARPA and in Canada through several institutions, as will be seen in the report Canada and Polar Science.

Ever since World War II the northern sector of the globe, where East meets West, has been recognized as a strategic areal entity. Most northern nations have an "arctic" institute which provides a focus for that nation's scientific, technical, strategic and administrative interests in the North. The importance of the availability of interdisciplinary information to support these interests has been acknowledged. Retrieval of this information must be area-based rather than subject-based (i.e., as is the case for the scientist studying a phenomenon regardless of its spatial aspects).

The need for an information source with a northern focus was admirably served for over 20 years by the Arctic Bibliography (Arctic Institute of North America, 1953-1975). This "splendid example of international cooperation" [was made possible] "only by the pooling and exchange of knowledge to produce minute, comprehensive, and accurate bibliographical control of a vast literature cutting across subject disciplines and national boundaries ..." (Smith, 1970, p. 14).

The impetus for the creation of one of the finest examples ever of regional bibliography lay in the experiences of World War II and the Cold War; witness to this fact is the major funding source for AB in the early years - the U.S. Department of Defense. Let's hope it doesn't take WWIII to bring us back together again over another "northern" bibliography!

Since the demise in 1975 of this reference work of 108,000 records with abstracts, the provision of northern information resources has become increasingly complex, making it necessary for the information provider to pursue several divergent routes to deliver information to the user. However, due to some recent technological advances, and to the persistence of the northern research community, it has become possible, and certainly desirable, for northern information to come under a single umbrella once more.

A. Present status and future possibilities for northern information networking

During the past year, at the 11th Northern Libraries Colloquy, at Northern and Offshore Information Resources (NOIR) Seminars, and at other meetings, both formal and informal, I have noticed (or perhaps willed?) the formation of a consensus around some realistic possibilities for implementation of networking of northern information.

I am assuming, for the purposes of discussion, that any of the following suggestions is possible.

1. A single online database. The Bibliography on Cold Regions Science and Technology (Thuronyi, 1951 -) is known as the COLD database online. It is the largest and most accessible online cold regions/northern information database and therefore would be the logical nucleus for an expanded "northern" database. Expansion of COLD to include, as a sub-file, the bibliographic database from the World Data Center-A for Glaciology is under consideration at present. Expansion could become truly international in nature with the addition of BOREAL (the online catalog of the Boreal Institute for Northern Studies Library, Univ. Alberta) and ASTIS (the Arctic Science and Technology Information System database from the Arctic Institute of North America, Univ. Calgary) from Canada and SPRILIB (the online catalog of the Scott Polar Research Institute Library, Univ. Cambridge) from the U.K. This grouping could provide a total of close to 200 thousand records representative of all subjects and all "northern" and polar areas. While it is possible that some other already available in-house and regional online catalogs or databases could also be added, much care must be taken to assure quality control and marketability of such a database. Also, its mission needs careful definition.

2. Several databases, all on one CD-ROM. Compact Disk-ROM technology is already in use by several information services.

CD-ROM technology could provide every "northern" information user with in-house access to all northern information at a price comparable to present microform and online services. A 12 cm. compact disk can hold approximately 500,000 to 600,000 bibliographic records and their indexes.

The Western Library Network (WLN), a division of the Washington State Library, has recently released its first CD-ROM database, called LaserCat. A three disc set contains the holdings of 250 libraries throughout the western United States and British Columbia, including holdings of all major libraries in Alaska. A one-year subscription to LaserCat, with quarterly updates, is $900 monthly until May 1; $1300 after that.

A proposal has been made through the Elmer E. Rasmuson Library/Media program, University of Alaska - Fairbanks to the U.S. Department of Education for an Arctic Bibliography Conversion for fiscal year 1988. This project would provide for the conversion of the 108,000 abstracts, published between 1953 and 1975 in the printed Arctic Bibliography, to CD-ROM.

At the 11th Northern Libraries Colloquy, the librarian in charge of SPRILIB suggested that their database be published as a video disc catalogue (Galpin, 1986, p. 161).

Pergamon/Infoline, the company which has recently acquired the COLD database, has announced its intention to take a leading position in CD-ROM publishing.

Online Computer Library Center (OCLC) is exploring the prospects of creating, on sufficient demand, user-tailored Compact Disc reference packages.

3. Several databases, all on one online search service. Every major "northern" database now is accessed through a different online service. Although it is possible that this problem will be solved through implementation of alternative 1. or 2. above, another alternative would be to gather the "northern" databases together on one online service. Pergamon/Infoline and STN (Scientific and Technical Network) are two internationally accessible vendors who presently collect databases around themes. Pergamon/Infoline has recently acquired the SDC ORBIT Search Service which includes the COLD database. Even if COLD were to be enhanced to include the northern area-oriented databases, it would still be desirable for the major international subject-oriented databases containing "northern" information to be available on the same service. Databases accessed through a common vendor use a single command language, a distinct advantage for the user when compared to entering multiple online services. In fact, most of the relevant subject databases are accessible on DIALOG at the moment, so we are likely to end up with relevant subject-oriented databases available there, and the "northern" databases available elsewhere.

Another type of database where it would help to have all of the northern databases together is the bibliographic utility. You are familiar with their acronyms - UTLAS, OCLC, RLIN, WLN ... These utilities are mainly used to allow shared cataloging of monographs and some reports, but most now have a "search only" account available also. For a moment consider the following example of diversification: The Byrd Polar Research Center (Ohio State University), along with the Alaska Resources Library and the Cold Regions Research and Engineering Laboratory (CRREL) Library, are members of the Online Computer Library Center (OCLC), the Dartmouth College Library, including the Stefansson Collection, is a member of Research Libraries Information Network (RLIN), and the Alaska Libraries belong to the Western Library Network (WLN)! (OCLC, RLIN, and WLN are U.S.-wide online cataloging utilities.) The Departmental Library at Indian and Northern Affairs Canada and many other Canadian libraries are members of UTLAS (University of Toronto Library Automated System)!

4. Interconnection of several databases, through protocols which permit different automated systems, using different hardware and software, to communicate with each other. The National Library of Canada is working on several possibilities of this nature. Also underway is the Linked Systems Project which is to allow communication between different types of computer hardware and software. The first phase of this project has enabled the Research Libraries Group to create a machine link for data transfer directly to the Library of Congress's name authority file. And we have heard today that QL Systems is developing "global search" software.

5. A database search aid. Although an accession tool rather than a networking facility, a search manual or pathfinder would guide the user to the desired northern information resources with examples of how to access them to

the best advantage. A Connecticut company, ONLINE Inc., has published several of these aids for subject disciplines. Regardless of the eventual "resting place" of northern information online, it will be absolutely essential to offer this type of guidance to the end-user.

In summary, all of the networking possibilities discussed above could be implemented. The elements are there; the need is for coordination of efforts.

Northern Libraries Colloquy

The theme chosen for the Twelfth Northern Libraries Colloquy is Northern Information - the Global Connection. The published proceedings of the previous eleven colloquies bear witness to the often discussed and reiterated need for an international network of northern information. The Twelfth Northern Libraries Colloquy will be held from June 5-9, 1988 in Boulder, Colorado, hosted by the Institute of Arctic and Alpine Research and the World Data Center-A, Glaciology. It will provide an opportunity to consolidate progress being made internationally toward networking "northern" information (Andrews, 1984). It is expected that useful discussions on the topics touched on here will contribute to a resolution of the problems of unified access to worldwide northern information.

Let me repeat what I said earlier. The main problem in implementation of an international network of northern information is the lack of a mechanism to coordinate work among different centers. Global networking is dependent on cooperation among several centers in several countries. A method to administer and organize such an effort is needed.

Is it possible that, for a start, the U.S. and Canada could once again enter into a cooperative effort such as that which spawned the Arctic Bibliography? Could it be that with a U.S. national networking plan already prepared in response to ARPA, and with new initiatives in Canada toward a NPI, the right political time has come in conjunction with the right technological time to make this a reality? I leave you with the questions, and hope for some answers from those at policy making levels in both of our countries.

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COMPUTERIZED DATABASE FOR ARCTIC OFFSHORE STRUCTURES

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Abstract

This paper describes a comprehensive computerized database on arctic offshore structures, prepared by Acres International Limited for a group of oil and gas, shipbuilding, and steel companies. The database was intended to cover offshore ice conditions in regions of interest, the mechanical properties of sea ice, static and dynamic ice forces on offshore structures, ice modelling and other specialist topics. It was aimed specifically at companies and individuals involved in developing designs for offshore platforms for oil and gas production in northern regions. The paper also discusses briefly the commercial aspects of this type of service for industry.

1. Introduction

The body of research literature for the Arctic and offshore, as it relates to the design of offshore platforms, is very broad and diffuse. Five or six major conferences deal with a range of issues, and a number of lesser-known journals occasionally publish papers which are of major concern. In addition, there are several general texts available, although the diverse nature of their contents limits their usefulness for specific design problems.

Acres International Limited, with offices in Calgary, Toronto, St. John's, and Anchorage (and other locations in Canada and the U.S.), has been involved in arctic and offshore engineering for over 15 years. As a result, the company had already compiled a large in-house database. For the past several years, Dr. A.B. Cammaert of Acres and Dr. D.B. Muggeridge of Memorial University of Newfoundland have been working on a book entitled "Ice Interaction with Offshore Structures" which is to be published in the spring of 1988. This has further enhanced the existing database.

The objective of the proposed study was to modify and expand the arctic engineering database developed by Acres and the two authors, and to offer the expanded database to industry if there was sufficient interest.

Scope of the database

The new database identifies almost 1000 references, and is complete in terms of precise sources and keyword listings. Abstracts were added which were previously not available. A code was added indicating where the reference document is available.

A database program was prepared using the latest version of dBase III, which is the most commonly used microcomputer-based software for database management.

The following topics were among those covered in the computerized database:

- o reviews on ice conditions around the northern hemisphere
- o mechanical properties of sea ice
- o static and dynamic ice forces on offshore structures
- o ice modelling and other specialist topics

Typical database records

A typical database record is given in Figure 1. The individual components consist of the following.

- o Each reference is identified by a unique 6-character alphanumeric code (co). This is much more convenient for indexing and retrieval (see Figure 2).

- o An availability code (av) indicates where a copy of the reference can be ordered.

- o Primary keywords (pk) and secondary keywords (sk) indicate the broad technical area and more narrow specialist areas, which each reference covers. See a listing of the keyword codes in Table 1, and the relationships between the codes in Figure 3.

- o The author fields (au) list the names and initials of the authors; if there are more than 3 authors only the first author and "et al." is used.

- o The title (ti) gives the full title of the journal, article, or book.

- Details on the source of the reference are given in the source (so) field.

- An abstract (to a maximum of 80-100 words) is included (ab), giving an overview of the objectives and scope of the reference.

The database program

The following options are available in the dBase III program:

I - Initialize a file
P - Print a record
A - Add a record
E - Edit a record
D - Delete a record
S - Search a record
Q - Quit

The program is very easy to use, as it is entirely menu-driven, and needs no prior knowledge of dBase III. It could be easily modified to suit a different input or output structure, for all types of bibliographic databases.

Commercial aspects

It may be of interest for libraries and other organizations to know how Acres offered this type of service to industry, and how the study was actually carried out.

The consulting industry has very limited funds available for in-house research, and the two authors of the text on the subject also had rather limited resources to carry out such a program. It was decided then, to approach industry in a brief 4-page proposal, and offer participation in the study to a larger group of companies.

Approximately 50 proposals were sent out, and 7 companies responded positively. By returning a signed letter and 1-page contract, with an "up-front" payment of $1,000, the commitment was made to participate.

The final payment of $1,500 was made on the receipt of the study "deliverables". These included a list of the database (both on paper and on diskette), a copy of the master program, and a program manual. Three research institutes also participated, on an information exchange basis (including the Arctic Institute).

The study was carried out under the direction of Dr. Cammaert. A part-time librarian was hired to conduct most of the research, and to prepare the data records. A summer student wrote the dBase program and Acres secretarial staff keyed in the data. Technical staff reviewed each record, and assigned the specific keywords.

The study was the first of its type for Acres, and since it proved to be successful, the work will likely be continued in other types of technical areas.

FIGURE 1. ARCTIC OFFSHORE STRUCTURES BIBLIOGRAPHY

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co: **CAM83b** av: ACU OEIC pk: IFO sk: FS VS DF DG BE
au: Cammaert AB Wong TT Curtis DD
ti: **Impact of Icebergs on Offshore Gravity and Floating Platforms**
so: Proc Int Conf POAC, v 4, Finland, 1983, p 519-536

ab: ... Various analytical techniques are presented for the calculation of impact loads. For gravity platforms the influence of the contact face and the effect of variable ice crushing strength as a function of strain rate and penetration depth are investigated. A simple one-degree-of-freedom model is formulated for the case of a bergy bit colliding with a semisubmersible. Several typical case studies are analyzed and motion characteristics are presented. The basis of development of a three-degree-of-freedom iceberg/structure interaction model is also described .... (Au)

co: **CAM83c** av: ACU OEIC pk: SPT sk: MA
au: Cammaert AB Tanner RG Tsinker GP
ti: **Design of Ice Management System for Arctic LNG Dock**
so: Proc Int Conf POAC, v 3, Finland, 1983, p 242-252

ab: A new dock design has been developed as part of the Arctic Pilot Project, for the year-round export of LNG from Melville Island....The paper describes the main elements of the ice management system and dock design. It presents the results of the analyses carried out to predict melting rates and end-of-winter ice thicknesses. Laboratory model tests have been conducted of the maneuverability of the LNG carrier and the ability to push ice under the dock. A summary of the test results is also presented. (Au)

co: **CAM86** av: CREL pk: IFO sk: SF BF IS AS
au: Cammaert AB et al
ti: **Adfreeze Forces on Offshore Platforms**
so: Proc Int OMAE Symp, v 4, Tokyo, 1986, p 541-548

ab: ...The paper reviews previous published information on adhesive strength, and its dependence on various physical and environmental parameters. An analytical approach is developed for the calculation of adfreeze loads on conical structures, which is compared with other formulations, and limited data from laboratory measurements. The paper describes the application of a finite element model to verify failure modes and loading calculations. (Au)

co: **CAR71** av: ACU OEIC pk: SPT sk: IM

FIGURE 2. ARCTIC OFFSHORE STRUCTURES BIBLIOGRAPHY
LISTING OF CODES BY SECONDARY KEYWORD

Secondary Keyword: II (Ice Islands)

BRE70	GOO80	KOV71	SAC85a	
BRE71	HNA78	MEL83d	SAC86	
DUN83	HOL73	PRO81b		

Secondary Keyword: MY (Multi-Year ice)

AGE81	COX84c	GEI83	PET79	VAU83
BAR80	COX84d	GLA77b	POU65	WAD80
BIL61	COX85b	GOO77	RIC85a	WEE83a
BLA86	COX85c	HIB84	RIC85b	WEE83b
BLI79	COX86b	HOC85	RIC85c	WEE84a
BOT82	CRO78a	KOV75b	SAC81	WHE81a
BRA80	DIC81	KOV83b	SAN85	WHE85
BRO86d	DOR75	KOV85	SCH83	WRI78
COX81	EVA85	MEL84	SIN85	WRI79

Secondary Keyword: RA (RAfted ice)

OSH80

Secondary Keyword: RI (ice RIdges)

ABD81	CRO78b	KOV75b	PRO81a	TUC82
AE81	CRO80	KOV83b	RIC84	WAD77
BER80c	DEI79	KRE81	RIC85a	WAD83
BIS86	DIC81	LEP81	RIC85b	WEE70
BRO83	EDW75a	LES75	RIC85c	WEE71
BRO86d	EDW75b	LEW78	ROJ81	WEE83a
BRU71	GEI83	NAD84b	ROS79a	WEE83b
COX83	GLA76	NEV83	SAC79a	WEE84b
COX84c	GLA77b	OSH80	SAY84b	WHE81b
COX84e	HNA78	PAL70	SEM75	WHE85
COX85b	HYS81	PAL71	SHA75b	WRI78
COX86b	KIM73	PAR73b	STR79	WRI79
CRO78a	KOV71	POU75	TUC81	

FIGURE 3.

BREAKDOWN OF PRIMARY
AND SECONDARY KEYWORDS

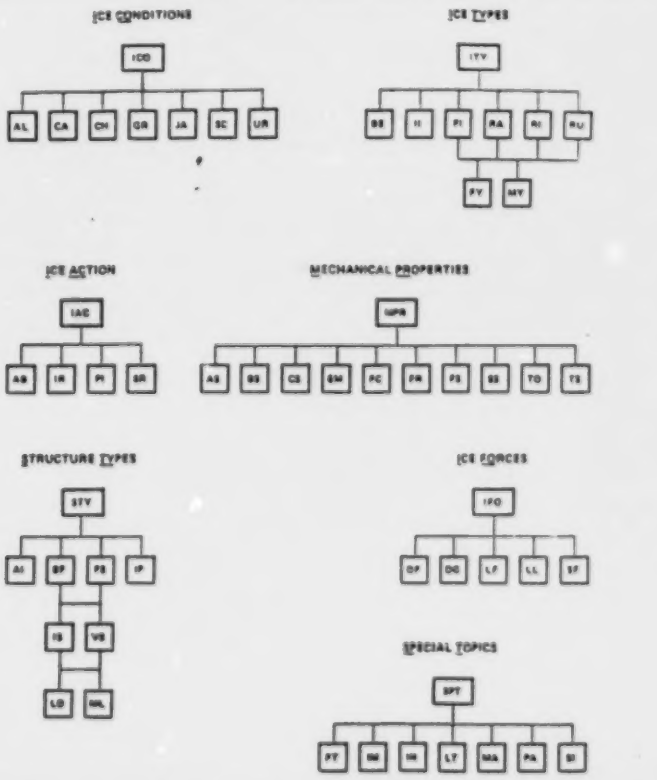

TABLE 1

BREAKDOWN OF PRIMARY AND SECONDARY KEYWORDS

Ice COnditions***	ICO
ALaska	AL
CAnada	CA
CHina	CH
GReenland	GR
JApan	JA
SCandinavia	SC
UssR	UR
Ice TYpes****	ITY
iceBErgs	BE
Floe Ice	FI
First-Year ice	FY
Ice Islands	II
Multi-Year ice	MY
RAfted ice	RA
ice RIdges	RI
RUbble Ice	RU
Ice ACtion****	IAC
Ice ABrasion	AB
Ice Rideup	IR
Ice PIleup	PI
ice ScouR	SR
Mechanical PRoperties****	MPR
Adhesive Strength	AS
Buckling Strength	BS
Compressive Strength	CS
Elastic Modulus	EM
Failure Criteria	FC
ice FRiction	FR
Flexural Strength	FS
Shear Strength	SS
fracture TOughness	TO
Tensile Strength	TS
Structure TYpes****	STY
Artificial Islands	AI
Bottom-Founded structures	BF
FLoating structures	FL
Ice Platforms	IP
Inclined structures	IS
Large-Diameter structures	LD
Multi-Leg structures	ML
Vertical Structures	VS
Ice FOrces****	IFO
Dynamic Forces	DF
Design Guidelines	DG
Limiting Forces	LF
Local Loadings	LL
Static Forces	SF
SPecial Topics****	SPT
Field Tests	FT
Ice Modelling	IM
INstrumentation	IN
Laboratory Tests	LT
ice MAnagement	MA
Probabilistic Assessment	PA
Structural Icing	SI

THE GOLDTHWAIT POLAR LIBRARY IN TRANSITION

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Introduction

The Goldthwait Polar Library is presently in a period of transition. What began in the 1930's and 1940's as Dr. Richard P. Goldthwait's personal polar library is now a special research library with approximately 60 users, comprised of research staff, faculty members and graduate and undergraduate students. In 1985 the Institute of Polar Studies purchased the papers and memorabilia of Rear Admiral Richard E. Byrd. Along with this purchase, a commitment was made to the estate of Marie A. Byrd to establish the Byrd Polar Research Center. The Byrd Center became a reality earlier this year. The establishment of the Center has many implications for the library; most importantly, the GPL will become part of The Ohio State University Library System and their substantial polar collection will be transferred to our library when it is feasible to do so. Polar history material is also being collected to supplement the Byrd Center's archives.

Collection development

The primary purpose of the library is to support the research needs of the scientific staff of the Center. While we do have some general books about polar and alpine regions, most of our holdings are publications on scientific investigations, such as research reports from other institutions, symposium volumes and conference proceedings. We routinely purchase specific issues of journals dealing with polar subjects and catalog them as monographs, increasing the usefulness of the library.

While very few department libraries officially collect and maintain reprint collections, we intend to keep ours because our users rely on it more than anything else in the collection. Our reprint collection is acquired through gifts or on an exchange basis. We have approximately 19,000 reprints, with emphasis on glaciology, climatology, geological sciences, paleontology, paleoclimatology and most recently, engineering. We have received large donations of reprints from some OSU faculty members and polar scientists from other universities upon their retirements. With these donations we are able to fill in the gaps of our collection and have complete folders of an author's works. Duplicates are available for exchange or for students' use.

The Byrd Center's administrators are actively pursuing archival material and donations which greatly affect the focus of the library. The library has not lessened its acquisition of scientific material for the research staff, but has added another dimension to our collection development. For example, we recently purchased 28 rolls of microfilm from the U.S. National Archives and Records Administration, entitled: "Records of the United States Exploring Expedition under the Command of Lieutenant Charles Wilkes". These are the records of the U.S. Exploring Expedition to Antarctica and the Pacific during the early 1840's. Undoubtedly, the Center would not have made such a major purchase if polar history material was only being collected peripherally. We

are also strengthening our reference collection to include bibliographies, such as the book edited by Clive Holland, "Manuscripts in the Scott Polar Research Institute, Cambridge, England", and "Search for the Northwest Passage: an Annotated Bibliography", by Alan Edwin Day.

The library would like to become a depository library for all materials published by the Polar Research Board of the U.S. National Research Council and SCAR (Scientific Committee on Antarctic Research) publications. The Polar Research Board is in the process of moving to another location and offered our library a number of their publications. We will also receive some foreign polar meteorological material, which may prove to be quite valuable to some of our patrons.

Byrd Center publications

The GPL is responsible for the Center's Publication Distribution Program, which includes mailing out the Center's Contribution and Report Series, as well as the library's Accessions Lists. This responsibility gives us the opportunity to be in direct contact with polar scientists and other institutions around the world. Many valuable exchanges have been arranged and our exchange list continues to grow.

Interlibrary loans

The amount of material we borrow from other libraries has been increasing steadily. This is due to our users' growing awareness that our response time is good and that our attention to their requests is immediate. Usually we get only a citation of the needed reference from our users. We verify the citation and type the ILLOAN request. If interlibrary loan is unsuccessful, we frequently request reprints and reports or information about publications directly from individual researchers at other institutions. When users request material from OSU's centralized interlibrary loan department, they must first fill out a form and then their request may not be processed for many days.

When a monograph or serial is first received at Technical Services, the piece is searched on OLUC. If a record is not found, or if it does not have acceptable copy, that is, a record that has an LC call number and reasonable subject headings, the piece is sent to an area called "pre-cat". The back-log at Technical Services is so great that material in "pre-cat" is not searched again until a year later. If at this time, there is still no acceptable record, it is sent to the cataloging department for original cataloging. If the results of our study show that most of our material is unique, we obviously need to make special arrangements with the University Libraries Administration so that our material is not in storage for a year. We have a reputation for efficiency and promptness among our users and it would be a shame to have that destroyed.

It is hoped that our study will also give us an accurate account of how much the GPL grows in a year, so that we may determine staffing needs and the amount of technical support we will need from the University Library System.

Conclusion

In order for us to increase our visibility and stature within the polar community we need to make our resources known to others. Having our holdings added to LCS and OCLC is one important step; continuing our publication distribution program is yet another. There are many changes and challenges in store for the GPL, but by planning now, we hope that the transition into the University Library System will be smooth.

ARCTIC AND OFFSHORE RESEARCH INFORMATION SYSTEM (AORIS)*

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Abstract

DOE has established a centralized and computerized bibliographic and scientific information system to assist the engineering, scientific, policy making, and planning community in the development of arctic oil and gas deposits. This paper describes the Arctic and Offshore Research Information System (AORIS), why it was created, which sources were accessed for inventory, and how it can be used. Essentially, it consists of three parts; namely, a directory that serves as a "roadmap" to the various data bases (centers of interest to those seeking arctic energy-related information and how to access them), the bibliographic/management information system (containing references and informational abstracts on energy-related research), and the scientific and engineering technology information system (containing quantitative data and descriptions of analytical models on sea ice, ice scouring/gouging, and subsea permafrost characteristics related to energy recovery). The directory and the two hierarchical information systems are linked and "menu driven". The AORIS also contains much of the so-called grey literature (i.e., data and/or location of arctic data collected but never published).

Introduction

The unique arctic environment poses significant technological and economic barriers to developing Alaskan oil and gas resources. That is, the technical uncertainties associated with the development of offshore oil and gas resources in the Alaskan Arctic created a variety of engineering problems regarding structures, pipelines, and shipping in the offshore regions. These include ice forces on structures, ice accretion, the stability of seafloor soils on structures, and potential frost heave and subsidence problems created by subsea pipelines. Each phase of arctic operations presents severe technical challenges that require clear identification of available scientific, engineering, and management information. This identification will enable

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Paper presented at the Third Annual Arctic Offshore Technology Conference and Exhibition, Calgary, Alberta, Canada, October 28-31, 1986.

industry to apply innovative solutions, and assist researchers in defining information gaps and research needs.

The solution to the engineering problems identified above requires a wide range of arctic information and data from a variety of sources. A large number of data bases or data centers currently exist that contain arctic information and data. These data bases cover a broad range of arctic information including history and culture, as well as engineering information. The U.S. Department of Energy's (DOE) role in developing the Arctic and Offshore Research Information System (AORIS) is to provide a single source of easily accessible bibliographic and technical information which focuses on the needs of the offshore oil and gas community.

Purpose

The purpose of the AORIS is to advance the arctic environment and technology knowledge base related to offshore oil and gas development. A centralized and computerized bibliographic and scientific information system is being developed and made available to the engineering, scientific, policy making, and planning community.

AORIS description

In general, the computerized AORIS is menu driven and contains arctic energy-related (i.e., information that is unique to the development of offshore oil and gas) bibliographical and technical information and a directory where all relevant arctic information (data bases/centers) resides. The directory serves as a "roadmap" to the various data bases of interest to those seeking the energy-related information and how to access these data bases. The directory portion of the AORIS contains a listing of approximately 80 major sources of arctic relevant data or library centers. The directory also contains a summary of what is contained in each data base or library center, search methodology where the desired information resides, point of contact, and appropriate telephone number(s). Figure 1 represents the major arctic information areas contained within the directory.

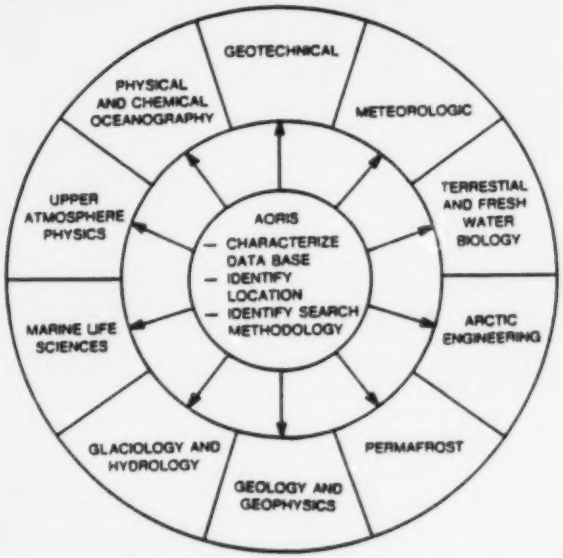

FIGURE 1. DIRECTORY TO OTHER SOURCES OF ARCTIC INFORMATION

The information containing part of AORIS consists of two components. The first, the bibliographic/management information system (BMIS) contains references and informational abstracts on energy-related research and engineering activities in the Arctic. The second, the scientific and engineering system (SEIS) will contain quantitative data and descriptions of analytical models on sea ice, ice gouging or scouring, and subsea permafrost characteristics related to energy recovery. The AORIS will be geographically dependent and, where possible, it will be site specific. The major topics will be sea ice, geotechnology, oceanography, meteorology, and arctic engineering, as they relate to offshore oil and gas activities: exploration, production, storage, and transportation. The structure of the AORIS is illustrated in Figure 2.

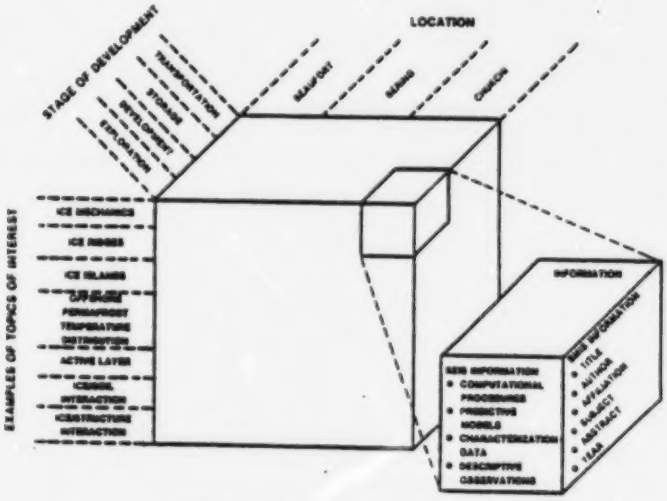

FIGURE 2. AORIS GRID

The two hierarchical information systems will be user friendly, linked along with the directory and installed as AORIS on the DOE/Morgantown Energy Technology Center (METC) computer system in Morgantown, West Virginia. Figure 3 illustrates the AORIS development and ultimate residence concept. The BMSI is searched via key words and the appropriate helps are available including an on-line thesaurus.

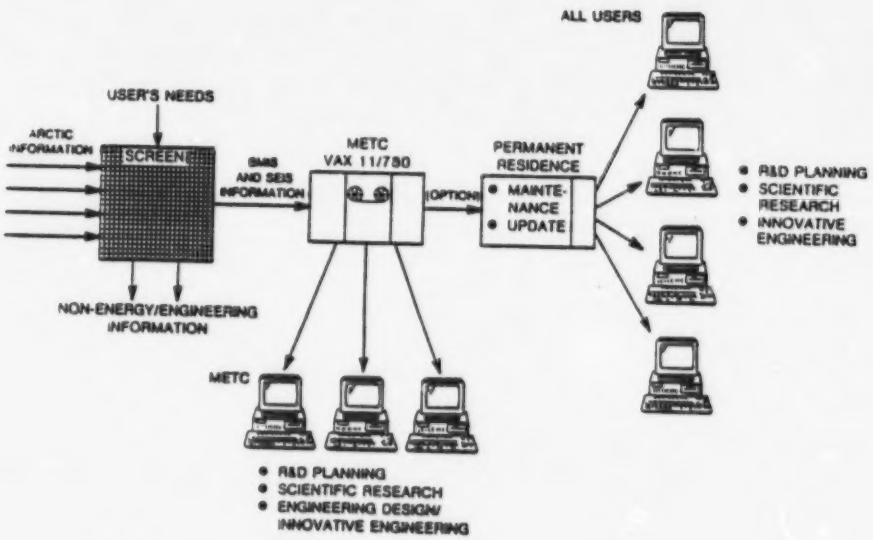

FIGURE 3.

THE AORIS CONCEPT

AORIS development and status

The development of the AORIS was initiated during the fall of 1985 and began with the preparation and conduction of an arctic users' needs survey. Approximately 55 companies or entities from 8 groups of stakeholders in arctic energy development were surveyed: Federal, state, and local agencies; university researchers; A/E firms; drilling contractors; consultants; and operators. Table 1 summarizes the primary message, the points of commonality and basic differences as revealed from the users' survey. These survey recommendations are being used to the maximum extent possible in the development of the AORIS. There is also an AORIS Technical Review Panel composed of recognized arctic experts that meets three to four times a year to recommend direction and review the information and data developmental aspects of the AORIS.

TABLE 1. SUMMARY ASPECTS OF USERS' SURVEY

The primary message from the users is that DOE should initially focus on a limited number of topics, and excel in their development.

Common Points of Interest

- o Enter the AOGA studies/reports in AORIS as soon as possible.
- o Develop a directory or "roadmap" to minimize confusion.
- o Coordinate with other data bases to minimize "windows".
- o Increase access to international sources of information.
- o Provide AORIS users with a feedback loop to DOE.
- o Provide hard copy on a quick-turnaround basis.
- o Provide timely entries or updates to the AORIS.
- o Point to or abstract grey literature (unpublished information).
- o Design the computerized AORIS to be user friendly.

Basic Differences

- o What information should be included in the AORIS.
- o Amount of information contained in the BMIS abstracts.
- o Who the actual AORIS users would be.
- o Where the AORIS should ultimately reside.

The BMIS is menu driven and user friendly and it currently contains approximately 7,000 arctic energy-related citations. Scientific and non-scientific personnel alike have searched the AORIS with ease and without documentation, i.e. without reading a user manual. Efforts are continuing to further fine tune the AORIS to improve user friendliness through the use of additional function keys. The baseline BMIS is essentially complete and will be uploaded on the DOE/METC computer system during November 1986. Following initial operation at METC and subsequent updating, the BMIS will become part of the DOE RECON data base system at Oak Ridge, Tennessee, during 1987.

The development of the SEIS portion of the AORIS was initiated during the summer of 1986. It is scheduled to be completed by the end of 1987.

DOE/METC has had formal contact and discussions with the developers of the Canadian Sea Ice Information System (CSIIS) at the Centre for Cold Ocean Resources Engineering (C-CORE), Memorial University of Newfoundland, concerning the development of CSIIS, how it is accessed, what quantitative information is contained in it, and whether the SEIS could and/or should be patterned after CSIIS for user ease of use since CSIIS is already on-line available. Besides arctic sea ice information, the SEIS will also contain information on ice gouging or scouring and subsea permafrost. The SEIS will also be menu driven and user friendly.

The directory, BMIS, and SEIS when completed will be linked, and together they will constitute the AORIS. The user friendliness of the menu aided operation and the special function keys that aid in the search of the AORIS allow the user to go back and forth from the directory, to the BMIS or the SEIS and back again, as well as to special helps. The completed AORIS is expected to be operational on the DOE/METC computer system by the end of 1987.

AORIS future

Upon the completed development of AORIS near the end of 1987, efforts will already be underway to have a permanent residence for the AORIS for ready public access. The idea is to have some service organization periodically update the AORIS and make it available to the user community on a cost reimbursement basis. The service organization(s) may be a university, a professional society, and/or a data base service company (e.g., the University of Alaska, the Society of Petroleum Engineers, or Petroleum Information Services).

ARCTIC DATA CATALOGUING AND APPRAISAL PROGRAM

Brian Smiley

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Introduction

The Arctic Data Cataloguing and Appraisal Program (ADCAP) was established in 1979 at the Department of Fisheries and Ocean's (DFO) Institute of Ocean Sciences (IOS) as part of the IOS environmental advice and data management activities and is continuing with the co-operation and support of the DFO's Freshwater Institute in Winnipeg, Manitoba. The objective of ADCAP is to locate and describe all oceanographic data collected in the Canadian Arctic in the last 100 years and to appraise their reliability. ADCAP is not intended to archive the data themselves, although acquired copies of reports, data and other publications are filed in the Ocean Information Division's Technical Records at IOS.

Detailed information about techniques and procedures employed in collection, storage and analysis, along with measurement ratings allow users to gain an impression of the completeness, reliability and accessibility of these

data. These catalogued inventories are proving to be of value to a wide variety of users including industry, government and universities.

Over one million dollars have been spent, mostly on contractual work, in searching for and examining data documentation, designing and applying rating systems, producing catalogues, and programming and maintaining the Oceanographic Data Inventory System (ODIS). Financial support has also been obtained from the Department of Energy, Mines and Resources (DEMR) and from the Department of Indian Affairs and Northern Development (DIAND). In the long-term, ADCAP will include the update of existing inventories and the expansion of its geographical and disciplinary scope until 1990, at an anticipated annual funding level of $50,000 to $100,000.

Cataloguing

The Arctic was divided into seven geographical regions for the purposes of ADCAP. These regions are: the Beaufort Sea, the Northwest Passage, the Queen Elizabeth Islands, Baffin Basin, Davis Strait, Hudson Bay-Foxe Basin and the Canada Basin-Arctic Ocean. For each region, up to seven catalogued inventories dealing with different oceanographic disciplines have been, or will be, published in the Canadian Data Report of Hydrography and Ocean Sciences Series.

The inventories are divided into three disciplines: physical, chemical and biological oceanography. Physical oceanographic inventories for any given region include descriptions of data sets containing temperature, salinity, currents and water level measurements. Chemical oceanographic inventories provide information on nutrients, hydrocarbons, trace metals, chlorophyll, oxygen and suspended particulates. The biological inventories are sub-divided into five biotic categories: plankton, zoobenthos, fishes, seals and whales; each is published as an individual catalogue.

Many data sets contain information from more than one region or discipline; each data set is assigned a unique identification number to allow for cross-referencing.

Appraisal

Careful attention is paid to the original documentation of methods and materials in the primary reference or source for each data set. The reliability of each measurement type is appraised using a rating system based on its conformity with basic scientific principles, completeness of reported methods and repeatability of procedures. This appraisal determines the reliability and comparability of the measurements and the confidence with which they can be used for purposes not foreseen by the original investigators.

There are five categories in the rating system as follows:

0 - The data are wrong, due to serious deficiencies or errors in collection or analysis procedures.
1 - The data are not internally consistent, based on investigator's reported doubts and other suspicions.
2 - The data could not be assessed because documentation could not be obtained.

3 - The data are internally consistent, but comparison with other data sets may pose problems.
4 - The data are internally consistent, and comparison with other four-rated data should be possible.

The "2" rating is actually an interim rating. When the appropriate documentation is found and appraised then the measurements can be judged for precision and accuracy.

Catalogue contents

Each published catalogue report contains the following sections:

Regional overview	trends and purposes
Data sources.....	bibliography, status and availability
General summary tables	measurement types, location, dates and agencies involved
Detailed summary tables	sampling efforts, latitudes and longitudes, collection/storage methods
Computer-plotted maps	locations of stations, transects or watches
Data rating	rationale, criteria, anecdotal notes
Indexes	geographical location, measurement type

ODIS

In addition to the printed inventories, an interactive graphics system called the Oceanographic Data Inventory System (ODIS) is being developed on a computer. When complete, ODIS will contain all the information in the published catalogues, with the advantages of being accessible via modem and capable of producing custom multi-disciplinary inventories using selection criteria requested by the user.

PROJECTIONS TO 1990

REGION	Beaufort Sea	Northwest Passage	Queen Elizabeth Islands	Canada Basin	Baffin Bay	Davis Strait	Hudson Bay-Foxe Basin
DISCIPLINE							
Physical Oceanography	x	x	x	x	x	o	o
Chemical Oceanography	x	x	x	x	o	o	o
Plankton	x	x	x	o	o	o	o
Zoobenthos	x	x	x	o	o	o	o
Fishes	x	x	x	o	o	o	o
Seals	x	x	x	o	o	o	o
Whales	x	x	x	o	o	o	o

x inventory completed o inventory not commenced

Contact

For more information about ADCAP and the availability of data inventories and the associated computer access, contact the author.

ENERGY TECHNOLOGY DATA BASE - WHAT IT IS

Barbara Sommers

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555 Booth Street, Ottawa, Canada K1A 0G1 (613) 995-4059

The Energy Technology Data Base (ETDB) is a multinational data base that contains energy technology literature from Canada, Japan, Denmark, the Federal Republic of Germany, Finland, The Netherlands, Norway, Spain, Sweden, the United Kingdom and the United States.

ETDB includes journal literature as well as research reports, conference presentations and patents. Citations are in English, with original language noted.

Canada submits data monthly on magnetic tape to the Office of Scientific and Technical Information in Oak Ridge, Tennessee, U.S., where they are combined with data submitted by all other participating countries. A master tape is produced and provided to each participant.

Subjects covered

ETDB seeks to provide comprehensive coverage of new energy technology literature on:

- fossil fuels;
- renewable energy sources;
- energy storage and conversion;
- end-use technology;
- advanced energy systems; and
- energy policy.

This literature includes aspects of chemistry, engineering, environmental sciences, biomedical sciences, physics, mathematics, computer science, and materials and instrumentation, when these are related to energy technology.

Using ETDB

Searching the ETDB from a computer terminal gives the user flexibility and selectivity. ETDB can be searched by author name, author affiliation, corporate title (if applicable), publication date, document type, country of origin, journal title, report number, subject category code, subject descriptors and words that appear in the title. Search tactics depend on the information retrieval system being used (see Table 1).

Accessing ETDB

Canadians can access the ETDB online through the Dialog Information Services, Mead Data Central or STN International by using a compatible computer terminal. For information on a Dialog Information Services subscription, contact the marketing department at 1-800-227-1927. The MDC telephone numbers are 1-800-227-9597 or (513) 865-6958. The telephone number for STN International is (614) 421-3600. Its telex number is 6842086CHMAB.

TABLE 1. EXAMPLE OF A RECORD ON ETDB

Serial number, document type	071470 Book analytic
Literary indicator	K: Conference literature, either as published proceedings or individual papers
Authors	Stuck, J.E; Woods, J.E.
Primary title	Heating the cooled load ratio; an objective function for optimizing heat pump performance
Title of book in which item appears	Heat Pump Technology Conference
Affiliation of authors	Iowa State University, Ames
City of publication	Stillwater, Oklahoma
Name of publisher	Oklahoma State University
Date of publication	1980
Pages	XII.1 - XII.6
Conference title	Third Annual Heat Pump Technology Conference
Conference place and date	Stillwater, OK, USA - 14 Apr 1980
Subject categories	Energy Conservation, Consumption and Utilization in Residential Buildings
Source of bibliographic input	Technical Information Centre
Country of affiliation	USA
Country of publication	USA
Subject descriptors	Air source heat pumps: performance; Air source heat pumps: optimization; Houses: air source heat pumps
Abstract	A paper presented at the Third Annual Heat Pump Technology Conference reported on the expected performance of a multimodel, solar-assisted heat pump system in the Iowa State University Energy Research House. That paper indicated that the Energy Research House, with a heating to cooling load ratio (H/C) of approximately 1, would consume much less energy annually.

Availability of the data base

The ETDB is distributed on magnetic tape by the Office of Scientific and Technical Information to the contracting party in each member country. In Canada, the data base is managed by Energy, Mines and Resources Canada through the Technical Information Division of the Canada Centre for Mineral and Energy Technology which is storing the tapes in the form of archives. Those in Canada interested in contributing pertinent literature to ETDB should contact the Technical Information Division of the Canada Centre for Mineral and Energy Technology at the address given above.

ACUNS RELATED ACTIVITIES

AUTRES ACTIVITÉS SE RAPPORTANT À L'AUCEN

ACUNS RELATED ACTIVITIES

Introduction

The remarkable variety of activities which was a feature of the Tenth Anniversary meetings at Ryerson was addressed in the Preface to this volume. In addition to the 'theme' conference sessions and the transacting of official ACUNS business, there were meetings of various groups with associations with ACUNS. Brief reports follow on the Northern Scientific Training Grants Program (which has nurtured students of northern studies in Canada for 25 years), Arctic Heritage and the 'subarctic universities' of Canada.

This section concludes with a summary of an Inuit fashion show staged at a reception prior to the Tenth Anniversary banquet.

NORTHERN SCIENTIFIC TRAINING PROGRAM MEETING

The organizing committee of the Northern Scientific Training Program held its usual meeting with ACUNS/AUCEN members during the annual conference at Ryerson. Dr. F. Roots, Environment Canada, is the current Chairman of the Program. He directed the meeting. Other Committee members present were:

Mr. Harald Finkler, Indian and Northern Affairs (Committee Secretary)
Mr. Alan Fox, Social Sciences & Humanities Research Council
Mr. George Hobson, Polar Continental Shelf Project
Dr. R. Janes, Science Institute of the N.W.T.
Dr. Jocelyn Lillycrop, Natural Sciences & Engineering Research Council
Mr. Donat Savoie, Indian and Northern Affairs
Dr. Brian Wheatley, Health & Welfare
Dr. Peter Adams, Association of Canadian Universities for Northern Studies

After a presentation by Harald Finkler, the meeting took the form of a question and answer session between the Committee and representatives of ACUNS' thirty-five universities.

The following tables are printed here for the use of readers of these Proceedings. They were distributed with the annual report of the NSTP viz. Northern Scientific Training Program/Programme de formation scientifique dans le Nord, Annual Report/Rapport annuel, 1986-87, April/Avril 1987, Indian Affairs and Northern Development, Ottawa K1A 0H4.

Measures of activity of the Northern Scientific Training Program of Indian and Northern Affairs Canada (from Finkler 1987b)

Distribution of Northern Scientific Training Funds by Number of Students Supported, Allocations per Student, Number of Days per Student in the North, and Cost per Student/Day in the North, 1982-83 to 1986-87

YEAR	TOTAL FUNDS ALLOCATED	TOTAL FUNDS SPENT/ COMMITTED	TOTAL NUMBER OF STUDENTS SUPPORTED	AVERAGE FUNDS ALLOCATED PER STUDENT	AVERAGE NUMBER OF DAYS PER STUDENT IN THE NORTH	AVERAGE COST PER STUDENT/ DAY IN THE NORTH
1982-83	$625,000	$618,477.87	285	$2,170.09	51.3	$42.30
1983-84	725,000	745,979.79	317	2,343.25	52.6	44.74
1984-85	825,000	783,955.62	295	2,657.48	52.7	50.43
1985-86	825,000	838,283.01	348	2,408.85	51.3	46.95
1986-87	825,000	808,862.42	366	2,210.00	48.8	45.28

Distribution of Students Supported by Northern Scientific Training Program by Scientific Field, 1982-83 to 1986-87

		SCIENTIFIC FIELD				
YEAR		PHYSICAL SCIENCES	LIFE SCIENCES	HUMAN SCIENCES	OTHER	TOTAL NUMBER OF STUDENTS
1982-83	N	89	104	78	14	285
	%	31.2	36.5	27.4	4.9	
1983-84	N	94	119	97	7	317
	%	29.6	37.5	30.6	2.2	
1984-85	N	87	123	83	2	295
	%	29.5	41.7	28.1	0.7	
1985-86	N	108	135	49	6	348
	%	31.0	38.7	28.4	1.7	
1986-87	N	123	143	97	3	366
	%	33.6	39.0	26.5	0.8	

Distribution of Northern Scientific Training Funds by Geographical Focus, 1983-84 to 1986-87

	GEOGRAPHIC FOCUS					
YEAR	NORTHWEST TERRITORIES	YUKON	LABRADOR	NORTHERN QUEBEC	OTHER*	TOTAL FUNDS SPENT
1983-84	$302,913.75	$103,150.57	$39,940.00	$167,994.00	$131,981.47	$745,979.79
	% 40.6	13.8	5.4	22.5	17.7	
1984-85	319,963.71	122,407.00	44,554.95	146,847.90	150,181.96	783,955.62
	% 40.8	15.6	5.7	18.7	19.1	
1985-86	371,708.16	131,247.98	35,709.00	154,571.76	145,046.61	838,283.01
	% 44.3	15.6	4.2	18.4	17.3	
1986-87	377,684.43	119,572.97	50,100.00	145,068.00	116,437.01	808,862.42
	% 46.6	14.7	6.1	17.9	14.3	

* Other category also included expenses incurred for projects undertaken in other circumpolar regions. Such allocations were discontinued after 1983-84 as a result of NSTP Committee revisions to Program Guidelines.

Distribution of Northern Scientific Training Funds by University, 1986 (adapted from Finkler, 1987b)

UNIVERSITY	TOTAL NUMBER OF STUDENTS SUPPORTED	SCIENTIFIC FIELD				AVERAGE NO. OF DAYS PER STUDENT IN THE NORTH	AVERAGE COST PER STUDENT/DAY IN THE NORTH				
		PHYSICAL SCIENCES	LIFE SCIENCES	HUMAN SCIENCES	OTHER			UNDERGRADUATE	MASTER'S	DOCTORAL	OTHER
University of Alberta	24	13	4	7	0	59.0	$39.90	5	12	7	0
University of British Columbia	4	1	3	0	0	124.0	30.34	1	3	0	0
University of Calgary	18	7	4	7	0	52.4	38.33	9	7	2	0
Carleton University	28	14	0	14	0	38.2	47.76	17	9	2	0
Concordia University	2	0	0	2	0	15.0	69.82	1	1	0	0
University of Guelph	8	1	6	1	0	71.1	18.27	4	3	1	0
Lakehead University	6	0	0	6	0	24.1	67.27	5	1	0	0
Université Laval	22	9	11	2	0	53.5	51.82	6	7	9	0
University of Manitoba	7	0	4	2	1	91.4	37.31	0	6	1	0
McGill University	28	13	7	8	0	48.6	44.11	12	10	6	0
McMaster University	7	7	0	0	0	53.4	52.03	1	3	3	0
Memorial University	20	10	6	4	0	46.4	42.24	10	9	2	0
Université de Montréal	17	5	3	7	2	30.0	71.96	5	9	3	0
University of New Brunswick	4	1	3	0	0	85.0	25.03	2	1	1	0
University of Ottawa	10	7	2	1	0	36.6	71.00	1	7	2	0
Université du Québec à Montréal	3	2	0	1	0	55.0	47.27	1	1	1	0
Queen's University	39	9	27	3	0	41.1	29.40	24	8	7	0
Ryerson Polytechnical Institute	11	0	6	5	0	46.8	51.92	11	0	0	0
University of Saskatchewan	11	0	8	3	0	56.1	49.79	2	5	4	0
Simon Fraser University	4	0	2	2	0	54.2	44.10	0	4	0	0
University of Toronto	24	5	16	3	0	49.1	47.13	10	10	4	0
Trent University	11	6	1	4	0	51.8	39.48	7	4	0	0
University of Waterloo	18	2	8	8	0	46.1	48.20	4	9	5	0
University of Western Ontario	9	6	2	1	0	39.3	59.55	3	4	2	0
University of Windsor	10	3	6	1	0	40.9	70.96	6	3	1	0
York University	21	2	14	5	0	49.7	44.01	3	16	2	0
TOTAL N	366	123	143	97	3	48.8	45.28	150	151	65	0
%		33.6	39.0	26.5	0.8			40.9	41.2	17.7	0.0

SUBARCTIC UNIVERSITIES OF CANADA -

ACUNS MID-NORTHERN UNIVERSITIES GROUP

Meeting of University Representatives
Ryerson Polytechnical Institute, Toronto
April 30, 1987

Present: Lakehead University, Thunder Bay: David Bates (Chair)
Laurentian University, Sudbury: Frank Mallory
Université du Québec en Abitibi-Témiscamingue: Rémy Trudel
Micheline Potvin
Gisele Maheux
Université du Québec à Chicoutimi: Jules Dufour
Labrador Institute of Northern Studies (Memorial University, St. John's, Newfoundland): Carol Brice-Bennett
David Kirby

1. Introductory remarks - Peter Adams (ACUNS)

A. The Proceedings of last year's meeting (Canada's Subarctic Universities/Les universités canadiennes du moyen-nord) are finished except for some funding needed to pay for the printing. The lowest tender has been received and the necessary money seems to be coming. These Proceedings, in effect, represent the work of the group's founding meeting.

B. With respect to making a submission to the Northern Scientific Training Program (NSTP) for a change in the southern boundary, Peter suggested that:

- getting a change in the southern boundary would be difficult and that we should make an application for a special grant to the Mid-Northern Universities our main effort;
- we might lobby for a change in the boundary but should not expect NSTP to show much interest;
- as a first step, we should apply for a one-time special grant for training students of about 1/3 to 1/2 of the current total for the five institutions, perhaps approximately $20,000;
- the application should be a joint application for funds in addition to those received now by the individual institutions.

2. Labrador Institute of Northern Studies

The Labrador Institute of Northern Studies of Memorial University had expressed an interest in joining the current four institutions in the Mid-Northern Universities consortium. It was unanimously agreed that the Labrador Institute would be accepted as a fifth member institution.

3. Proposal for a Two-Year Certificate Program - David Kirby, Memorial University

The program as proposed would be delivered by distance education methods. It could be part-time studies and could be part of a degree program. Various methods of delivery could be used.

One university would have to award the certificate. Each university would offer two or three courses, which could be existing courses or new ones. Each university would recognize course credits from the other institutions.

We agreed that, 1) the program would be general, based on existing courses suitable for distance education delivery, 2) Carol and David would develop a draft proposal, and 3) each institution would let Carol know what courses at each institution are relevant to subarctic/mid-northern studies and could be delivered by distance education methods. We were to respond to Carol in a couple of weeks, with ideas for funding sources if possible.

4. Proposal for a Joint Four-Year Degree Program - Frank Mallory

Frank Mallory described the advantages of the four-year program as 1) that it would provide an immersion experience in two languages and cultures and 2) that it would use existing on-campus courses. Programs could be set up in any appropriate discipline. Major additional expense for students would be for travel. To subsidize this we could seek grants.

One problem is that the transfer of such a large number of credits from other institutions is not possible under current regulations at most universities. Could a small number of exceptions for a program of this type be approved by a Senate? Registrars may also have objections.

A joint administration committee would probably be necessary.

Would the program be for any general studies or would there need to be a subarctic/mid-northern focus? Generally, we thought that there should be a minor subarctic/mid-northern emphasis provided by some elective courses. The milieu of the four universities would be part of the subarctic/mid-northern experience.

Would the program be based in one university or in any university? One university could agree to handle all the administration and grant the degrees or each university could register and graduate students. The success of each university in getting approval from its Senate may determine how the program is administered.

We agreed that Frank would develop a proposal. Each institution would give him information on current regulations about transfer of course credits. They would also include an academic Vice-President's opinion on the possibility of the institution being able to obtain Senate approval for the program and a list of "subarctic/mid-northern" university courses that might be suitable for the program. A copy of the current university calendar would also be useful for Frank.

Frank will try to have a draft proposal by mid-July.

5. NSTP Grant Application

Geoff Weller would co-ordinate the application of the five institutions for a block grant from the NSTP, perhaps for $40,000. He could talk to Frank about details.

6. Conference Next Year

We agreed to try to hold a second conference next year, either at Abitibi-Témiscamingue or Chicoutimi.

David Bates, Chair

LES UNIVERSITÉS MÉDIONORDIQUES DU CANADA -

GROUPE DES UNIVERSITÉS MÉDIONORDIQUES DE L'AUCEN

Rencontre des délégués des universités médionordiques
le 30 avril 1987, au Ryerson Polytechnical Institute, à Toronto

Participants: Lakehead University, à Thunder Bay: M. David Bates (président du séance)
Université Laurentienne, à Sudbury: M. Frank Mallory
Université du Québec en Abitibi-Témiscamingue: M. Rémy Trudel
Mme Micheline Potvin
Mme Gisèle Maheux
Université du Québec à Chicoutimi: M. Jules Dufour
Labrador Institute of Northern Studies de la Memorial University de Saint-Jean de Terre-Neuve: Mme C. Brice-Bennett
M. David Kirby

1. Remarques liminaires, par M. Peter Adams (AUCEN)

A. La réalisation du Compte-rendu de la Conférence de l'an dernier (Canada's Subarctic Universities/Les universités canadiennes du moyen nord) est complétée, à part le financement des coûts d'impression. La soumission la plus basse a été choisie, et les fonds nécessaires paraissent arriver. Ce Compte-rendu est, en fait, le fruit des délibérations pour la création du Groupe.

B. En ce qui concerne le mémoire présenté aux responsables du Programme de formation scientifique dans le Nord (PFSN), en vue d'obtenir une modification de la limit méridionale de la région concernée, M. Adams indique que:

- il serait difficile d'obtenir cette modification, et que le groupe devrait axer ses efforts sur l'obtention d'une subvention spéciale aux universités médionordiques;

- il faut que le groupe exerce des pressions en vue de cette modification, mais sans s'attendre à ce que les responsables du PFSN montrent beaucoup d'intérêt;

- il faudrait qu'en premier lieu, le groupe demande l'octroi d'une subvention spéciale et unique à la formation des étudiants, dont le montant atteindrait du tiers à la moitié du total de la subvention accordée aux cinq établissements intéressés, disons environ 20 000 $;

- cette démarche devrait prendre la forme d'une demande conjointe de fonds additionnels au montants reçus actuellement par chacun de ces établissements.

2. L'Institut d'études nordiques du Labrador

L'Institut d'études nordiques du Labrador de la Memorial University a fait savoir qu'il désirait se joindre aux quatre membres actuels du Groupe des universités médionordiques. Ces membres entérinent à l'unanimité l'admission de l'Institut d'études nordiques du Labrador en tant que cinquième membre.

3. Proposition de création d'un Programme de certificat de deux ans, présentée par M. David Kirby, de la Memorial University

Le Programme, tel que proposé, serait constitué par des études à temps partiel, faites à distance, et pouvant peut-être s'inscrire dans un programme de diplôme. Divers véhicules d'enseignement pourraient être utilisés.

Ce certificat serait octroyé par une université membre. Chacune des universités membres offrirait deux ou trois cours, soit nouveaux, soit déjà existants, et reconnaîtrait la validité des crédits de cours attribués par les autres établissements.

Les délégués conviennent que: 1) le programme serait de nature générale, et fondé sur les cours existants qui conviennent à l'enseignement à distance; 2) Mme Brice-Bennett et M. Kirby élaboreraient un avant-projet; et 3) chaque établissement ferait connaître à Mme Brice-Bennett quels sont ses propres cours convenant à un programme d'études médionordiques et pouvant être enseignés par les méthodes de l'éducation à distance. Les participants feraient parvenir cette information à Mme Brice-Bennett dans la quinzaine, et suggéreraient des sources de financement, si possible.

4. Proposition de Programme commun de diplôme de quatre ans, par M. Frank Mallory

M. Mallory décrit les avantages d'un programme de quatre ans comme suit: 1) il donnerait de l'expérience aux étudiants par immersion dans deux langues et cultures, et 2) il serait basé sur les cours donnés dans les établissements eux-mêmes. On pourrait mettre sur pied des programmes dans toute discipline appropriée. Les seules dépenses additionnelles importantes des étudiants seraient leurs frais de voyage, pour lesquels les participants pourraient demander des subventions.

Une difficulté serait causée par la non-transférabilité, selon la réglementation intérieure de la plupart des universités, d'un grand nombre de

crédits de cours accordés par d'autres universités. Les Conseils d'université (sénats) pourraient-ils entériner certaines exceptions en faveur de ce Programme? Les registraires pourraient aussi présenter quelques objections.

Il serait probablement nécessaire de créer un comité mixte d'administration.

Le Programme serait-il fondé sur des études générales, ou serait-il fortement axé sur des études médionordiques? De façon générale, les participants lui conféreraient un aspect médionordique mineur grâce à quelques cours facultatifs. Le cadre d'action des quatre universités permettrait de développer l'expérience médionordique des étudiants.

Le Programme serait-il basé sur une université particulière, ou sur l'une quelconque d'entre elles? Une des universités membres pourrait assumer l'ensemble de l'administration du programme et octroyer les diplômes, ou encore chaque université membre pourrait inscrire les étudiants et octroyer les diplômes. La façon dont le Programme serait administré dépendrait des efforts de chaque université pour obtenir l'approbation de son Conseil d'université.

Les participants conviennent que M. Mallory devra élaborer un avant-projet. Chaque établissement lui communiquera le règlement intérieur concernant le transfert de crédits de cours et l'opinion de son vice-président à l'enseignement et à la recherche au sujet de la possibilité d'obtenir l'approbation du Programme par le Conseil d'université, ainsi qu'une liste de cours médionordiques que ce Programme pourrait assurer. Il serait également utile que M. Mallory reçoive un exemplaire de l'annuaire universitaire de l'année courante. M. Mallory fera de son mieux pour présenter un avant-projet dès la mi-juillet.

5. Demande de subvention du PFSN

M. Geoff Weller coordonnera l'élaboration de la demande des cinq établissements pour une subvention globale du PFSN de, disons, 40 000 $. Il pourra prendre contact avec M. Mallory au sujet des détails.

6. Conférence de l'an prochain

Les participants conviennent de tenir une seconde conférence l'année prochaine à l'Université du Québec, soit à Chicoutimi, soit en Abitibi-Témiscamingue.

le Président de séance

David Bates

ARCTIC HERITAGE WORKSHOP, RYERSON POLYTECHNICAL INSTITUTE

APRIL 29, 1987

Present

Peter Adams, ACUNS and Trent University, Chair
J. Gordon Nelson, Faculty of Environmental Studies, University of Waterloo, Waterloo, Ontario N2L 3G1
François Bregha, Northern Affairs Branch, External Relations Directorate, Corporate Planning Group, Department of Environment, Ottawa, Ontario K1A 1C7
Fred Roots, Science Advisor, Department of Environment, Ottawa, Ontario K1A OH3
George Francis, Department of Environment & Resources Studies, Faculty of Environmental Studies, University of Waterloo, Waterloo, Ontario N2L 3G1
Harold Eidsvik, Senior Policy Advisor, Parks Canada, Ottawa, Ontario K1A 1G2
Julian T. Inglis, Office of Conservation and Environmental Policy, Department of Indian & Northern Affairs, Ottawa, Ontario K1A OH4
Monte Hummel, World Wildlife Fund, 60 St. Clair Avenue East, Suite 201, Toronto, Ontario M4T 1N5
Fred Helleiner, Department of Geography, Trent University, Peterborough, Ontario K9J 7B8
Paul Grigoriew, Faculty of Environmental Studies, University of Waterloo, Waterloo, Ontario N2L 3G1
Charles Myers, Division of Polar Programs, National Science Foundation, 1800 G. Street, Room 620, Washington, D.C. 20550 U.S.A.
C.M. Barnabé, Senior Policy Advisor, Constitutional Development and Strategic Planning Branch, Department of Indian and Northern Affairs, Ottawa, Ontario K1A OH4
Frank Duerden, Department of Geography, Ryerson Polytechnical Institute, 350 Victoria St., Toronto, Ontario M5B 2K3

Introduction

Dr. Nelson had convened the workshop for ACUNS to seek thoughts and initiatives, from IUCN Commissions, northern and native groups and other interested parties (see Appendix A for list of invitees), on recommendations generated by the Arctic Heritage Symposium, 1985. The focus of the discussions was the Major Conclusions of the Arctic Heritage Symposium, sponsored by ACUNS at Banff in 1985 (Table 1, see Nelson et al, 1987, pp. 11-14). There was a good discussion of these at the beginning of the meeting.

TABLE 1

MAJOR CONCLUSIONS
Working Committee Members
(from Nelson et al., 1987, 11-14)

After detailed discussion the following conclusions were accepted by the Plenary Session on the last day of the Symposium.

TO ACUNS AND OTHER NORTHERN UNIVERSITY ORGANIZATIONS

1. Given the success of this first symposium in bringing together persons with diverse interests in research on natural and human aspects of the arctic area, an Arctic Heritage Forum should be created to meet every two years to discuss research and its implications for Arctic Heritage and to promote communication and advances through a membership network, a newsletter and other means. The Forum should be developed in consultation with Unesco's Northern Science Network and other relevant bodies.

2. A Circumpolar Universities Group should be organized to hold seminars, discussions and promote exchanges and other cooperative activities. The group should hold an international conference at 2-3 year intervals on key research or educational topics. In this regard it is suggested that the first meeting consider communications in its technical, social, economic and other aspects because of its growing importance and its uncertain implications for northerners and others interested in understanding and working with them.

3. In order to promote better relations with and to better serve northern peoples, ACUNS should plan and hold regular workshops on topics of common interest, in collaboration with northern groups and agencies. The forthcoming meeting of ACUNS in Yellowknife provides the first opportunity to develop this idea.

4. ACUNS and other northern university organizations should study the possibility of developing a co-ordinated inventory of ongoing research related to fields such as Arctic Heritage.

5. ACUNS and other northern universities should collaborate with northerners in the development of Regional Heritage Resource Strategies of the type advocated at this Symposium for northern Sweden. Such co-operation should involve possible development of clearing houses, data banks, and other research and information tools in collaboration with appropriate research agencies, for example the Northwest Territories (NWT) Science Institute in Canada.

6. To promote dissemination of the many ideas and detailed recommendations made at the Symposium through prompt publication of the Proceedings which should immediately be sent to conference participants, the media, key decision-makers, and others who could use or benefit from the findings. An attempt should also be made to spread the results more vigorously through radio, TV or other northern programming, in the manner being developed by ACUNS in cooperation with CBC.

TO CANADIAN FEDERAL GOVERNMENT AND ESPECIALLY DEPARTMENT OF ENVIRONMENT AND FISHERIES AND OCEANS

1. Having discussed several international agreements/conventions pertaining to Arctic heritage or related matters and having learned of the aborted proposal to hold a study workshop on the range of available agreements/conventions and their scope and effectiveness, the Symposium recommends that this initiative be reconsidered and held, preferably in association with the 6 June 1986 World Conservation Strategy meeting in Ottawa.

TO ACUNS, INUIT CIRCUMPOLAR CONFERENCE (ICC) AND OTHER COMPARABLE NORTHERN ORGANIZATIONS

1. Having recognized the mutual research, education, information and other social benefits to be derived from closer cooperation between universities and indigenous peoples, the Symposium urges ACUNS and indigenous organizations such as The Inuit Circumpolar Conference (ICC) to develop standing liaison committees or other regular means of communication and cooperation.

TO IUCN

1. To establish an Arctic Working Group with the Commission on Ecology or a comparable body in order to more effectively address northern issues, and to facilitate doing so in collaboration with ACUNS and other interested research groups.

2. To study the applicability of Antarctic treaties, conventions and agreements for research, information exchange and resource environmental managements in terms of their applicability to the Arctic area.

3. To continue the development of the inventory of national park and protected areas through the IUCN Conservation Monitoring Centre in order to assist governments and other interested agencies in developing a comprehensive arctic heritage system and provide a basis upon which specific cooperative programs can be pursued.

TO ALL GOVERNMENT AND NON-GOVERNMENT GROUPS INTERESTED IN AND RESPONSIBLE FOR ARCTIC HERITAGE

1. In recognition of the value of research in both undisturbed and disturbed environments, the opportunities for more collaboration among universities, government and industry, the need for monitoring and multi and interdisciplinary studies, the importance of arctic areas as unusually resonant recorders of and benchmarks for global climatic and other changes, and the need for long term research as a basis for greater understanding, the Symposium recommends that several high Arctic areas be made the focus of long term coordinated research. Such activity should be facilitated by stronger commitment to research as a basic use of national parks, national Canadian wildlife areas or other heritage management areas. Unesco's Man and the Biosphere Programme (MAB) could be used more frequently to encourage this type of research.

2. The Symposium strongly supports the development of a more complete and flexible Arctic Heritage Area system, with greater use of national wildlife areas, larger territorial parks, Biosphere Reserves and other institutional arrangements designed to manage areas with different physical, biological and cultural characteristics as well as different resource use patterns and prospects. In this regard, the Symposium supported many of the recommendations in the recent Canadian Northern Conservation Task Force Report. In particular, the Symposium urges identification and development of environmentally significant areas in coasts and marine areas, as well as lakes and rivers, as such systems are not adequately represented in current parks and other types of heritage management areas.

3. The Symposium strongly urges improved and expanded collaboration among Arctic nations in the study, establishment and management of heritage areas, particularly transboundary heritage areas, in which to provide for sustainable use of migratory fauna and other dynamic elements of northern ecosystems. Such collaboration should be conducted in consultation with local populations because of their special reliance on certain species. In this regard the point was made that species vary in their relations with different peoples and areas. Many terrestrial mammals move largely within the domain of a territory or a nation. However, some terrestrial mammals and many birds and marine mammals migrate over great distances, are used by and contribute to the heritage of many separate peoples and nations and must be viewed and managed as a global inheritance.

4. Recognizing the frequently weak funding and staffing of heritage area programs, which prevent their effective implementation, even though apparently adequate "on paper", the Symposium strongly supports better funding of Arctic Heritage programs, and also communications activities designed to promote greater understanding of their importance to renewable resource users, recreationists, tourists, scientists and educators, as well as environmental groups and other users within and without the Arctic.

TO REGIONAL SEAS PROGRAMME AND UNEP

1. Recognizing the opportunity for and necessity of cooperative intergovernmental research, planning and management, in regard to arctic heritage resources, and related matters such as oil spills and marine pollution, the Symposium urges the United Nations Environmental Program (UNEP) to initiate an Arctic Regional Seas Programme, through workshops and the development of a convention and appropriate protocols in the manner of the Mediterranean and other Regional Seas of the world.

Working Committee

J.G. Nelson
R.D. Needham
Peter Adams
Nicholas Polunin
George Francis

Those present then commented from their various viewpoints focussing on developments (or absence of same) in Arctic Heritage since 1985.

Roots

1. The recently published report of the World Council on Environment and Development is pertinent to 'Arctic Heritage' today (World Commission 1987). The result of meetings in Oslo (1985) and Ottawa (1986), this report clearly recognizes that 'natural resources' are 'heritage'. There is not as much as one would like specifically on the Arctic but the Native Peoples section is very relevant. It provides 'good strong words' in support of Arctic Heritage.

2. The fundamental revision of the Unesco Man and the Biosphere (MAB) program and Action Plan for Biosphere Reserves is also important. This is especially true of the instruction to integrate the MAB Northern Science Network more closely with the activities of the National Committee for MAB in each circumpolar country. This revision seems to have made the Programme more amenable for the application of basic northern research and data gathering to Heritage values. Previously, MAB focussed on particular bio-geo regions (e.g. "Rain forest"). Now the emphasis is on theme topics, viz. (a) Ecosystem change under different degrees of human impact, (b) Processes of restoration, restabilization, etc. of altered systems, (c) Human investment and resource use ("investment" including general acquisition of knowledge, etc.), (d) Human response to environmental change.

The last two of these explicitly include socio-psychological responses as well as life support needs (in the developing world, one consideration is the utilitarian approach to the environment). This all fits in with the Heritage idea.

Canada's Northern Science Network has had some success but is not too vigorous. But it has strong international support.

There is no direct link between ACUNS and the Network. Perhaps there should be?

3. The approach, in 1986, by the International Council of Scientific Unions (ICSU) of planning for the International Geosphere-Biosphere Program (IGBP) is very important for most aspects of science with which ACUNS is involved. This planning will include:

(a) a careful examination (with MAB and UNEP) of Biosphere reserves and parks and other protected areas with a view to identifying 'biological observatories' (longterm reserves) for studying species diversity and change, biophysical, chemical and energy flows, etc. This will involve study of the most basic aspect of "life-giving" environments and how they are affected by humans.

This is going to influence all major science agencies during the next few years, for example, grant applications will be assessed in the light of this major linking framework for studies of 'the environment'.

(b) a consideration, jointly with the U.S., of specific areas in arctic regions that will be suitable for extended studies of ongoing changes in land use, effect of biota on the physical and chemical environment, recovery of environmental history over the last 20,000 years and the last 200 years, identification of polar ecosystems that are particularly sensitive to global change, etc.

A booklet on this (i.e. on the role of the Arctic Regions in global environmental processes) is in preparation (Anon. 1987).

There is a role for ACUNS and others in building ideas of Arctic Heritage, i.e. "human values with respect to the environment", into IGBP thinking. MAB and other protected areas are already being assessed as 'observatories'.

Roots is working on criteria for Arctic bio-geophysical observatories (Chapter in Anon. 1987). He said that the universities might wish to tell agencies what criteria should be used, for example, to scrutinize research applications in the light of IGBP and Arctic Heritage.

Other Developments since the 1985 Arctic Heritage Symposium include:

4. The establishment of the Polar Secretariat of the Royal Swedish Academy of Sciences and moves towards a Danish Polar Institute, both with explicit responsibilities for 'arctic heritage' (Karlqvist and Bjorn-Rasmussen, 1984; Denmark 1985).

5. The publication of Canada and Polar Science (Roots et al. 1987) with recommendations for Canadian involvement in national and international cooperative ventures including Antarctica.

6. The Comité Arctique International Conference in Reykjavik in 1986, on 'Restoration and Vegetation Succession in Circumpolar Lands'. This was, in effect, a thorough scholarly follow-up on the biophysical side of arctic heritage which was touched on in Banff (see Webber 1987).

7. The elaboration of an arctic science policy by the Inuit Circumpolar Conference at Kotzebue, incorporating some of ACUNS' ethical principles for research. This is, more clearly than a non-Inuit could ever do it, a full statement on heritage values.

8. The 'Recommendations for Necessary Research-Cultural Resources' section of the Five Year Plan for Arctic Research (September 1986) which is in the final stages of development by eleven U.S. federal agencies. The response to these recommendations by the North Slope Borough and the U.S. Arctic Research Commission have focussed U.S. debate on 'heritage' following Berger's 'Village Journey' (Berger 1985).

There appears to be willingness to act on either side of the Alaska/Canada border. There is talk again of an International Arctic Science Committee modelled on the Science Committee for Antarctic Research (SCAR) which has been remarkably successful. The current Chair of the U.S. Arctic Commission is a former Chair of SCAR! Meetings in San Diego (1986) and Oslo (February 1987) will be followed by a fall

1987 meeting in Stockholm. Roots is writing a discussion paper for this last. Discussions focus on the desireability and difficulty of international cooperation in the management of land use, protected areas, migratory species, etc. (see Roots and Rogne, 1986).

Eidsvik - on IUCN

The International Union for the Conservation of Nature and Natural Resources (IUCN) continues to be interested in Arctic Heritage but there has been little action since Banff 1985.

There are various reasons for this. Specific IUCN priorities (e.g. Developing Countries) turn attention from the Arctic. Eidsvik and Peter Jacobs succeeded in getting an unfunded circumpolar initiative or program onto the IUCN agenda but interest in and responsibility for this is very thinly spread across a wide variety of IUCN structures and projects.

A small Task Force might succeed in pressuring IUCN at its next General Assembly (February 1988). This might be something like the Antarctic Task Force. However such an effort would have to be self-funded and would have to expect resistance.

Francis - on MAB

Only 4 out of 261 biosphere reserves are in Canada and many of these are reserves in name only.

There are 8 or 9 in the circumpolar North, none in Canada!

ACUNS might cooperate with MAB-Canada and Native groups in connection with MAB's four new themes (see Roots, above). Theme #2 involves badly abused areas (e.g. contaminated lakes). Suggestions re work within a context of sustainable development are always welcome.

Someone commented that in Scandinavia, work in protected areas is being built into university teaching programs, i.e. students get special credit for it?

Inglis - on the Task Force on Northern Conservation

He referred to correspondence between Jules Dufour of ACUNS and the Minister of Indian and Northern Affairs on this topic (Minister's reply of 9 March 1987). DINA has endorsed this report although the Minister has not publicly said so.

The Territories' Ministers are willing to work towards a sustainable development strategy and the federal government is willing to support this in any appropriate way. Inglis is optimistic about the strategy although progress to date has been 'mainly at the bureaucratic level'. There will be a review and critical analysis session in Banff in September 1987. Hopefully, a solid Canadian base will be developed for a Circumpolar Conservation Strategy.

Nelson

Outlined ACUNS' position (see page 15 of Nelson et al. 1987) that since the Symposium, the ACUNS Board has considered the conclusions and has written letters and made representations to appropriate agencies in regard to many of them. The Board decided it could not accept responsibility for a specialized activity such as the Arctic Heritage Forum, believing it to be more appropriate for an agency such as IUCN. The Board is positively disposed toward the other conclusions directed to it, with reservations about its role in regard to a coordinated inventory of ongoing research because of the scope, cost, and need for extensive collaboration with many groups. Upon publication of the Symposium Proceedings ACUNS will make inquiries with interested parties about a possible workshop to address the Symposium recommendations. The Association does not want to simply add another group to a plethora of groups. Dr. Nelson is not sure whether the existing networks are effective anyway. Certainly activity and interaction is declining as oil and gas and economic activity slow in the North.

The idea of applying the Regional Seas concept to the Arctic (see pp. 625-646 of Nelson et al. 1987) is, at least, on hold because of the transfer of UNEP's Regional Seas Programme from Geneva to Nairobi and changes in staff.

Hummel

The World Wildlife Fund Canada is in the throes of a phase of very rapid growth in income and expenditures (50% p.a. for a number of years). They are sponsoring 150 projects. He distributed two publications, viz. World Wildlife Fund 1986, December; World Wildlife Fund 1986, Annual Report. The whales project involved $2 million over 3 years. This was a pioneer venture in cooperative research with native peoples (50% of the funds for habitat conservation in Canada come from the U.S.-based Ducks Unlimited).

WWF's involvement with Indigenous Survival International (includes 70 native groups) is also notable. It contributed towards the inclusion of an Indigenous Peoples Folio in the World Conservation Strategy.

However, Hummel is greatly concerned about 'dynamic inaction'. This refers to the extent to which we, in Canada, are bogged down on heritage area matters. He believes that no progress is being made and that all jurisdictions are at fault. "Strategies become a surrogate for action", "strategies spawn strategies which spawn strategies....". There is a complete lack of accountability for progress or lack of it in conservation. In the private and public sectors, heads do not "roll" if progress is lacking, indeed we have no way of detecting progress. Parts of this assertion were disputed.

Similarly, he feels that Canada's involvement in international conservation schemes is also a surrogate for real action. We tout listing areas on various world protection lists as action! "The emperor has no clothes!"

ACUNS should not contribute by developing more studies and strategies for their own sake! The academic community has contributed more than its share to 'dynamic inaction' already.

Increasingly, World Wildlife Fund research funding will only be available to projects which result in real action, especially in the Conservation area.

Perhaps Canada does need a means of properly monitoring and measuring Conservation activity in the light of national objectives. This might be a worthwhile project for ACUNS.

Hummel concluded by saying that one problem in Canadian Conservation is at the final, implementation, stage. We seem to be incapable of coming up with good "win-win" deals. Moresby is a case in point - the participants cannot finally saw off a real deal.

In ensuing comments it was suggested that Canadians need to be permitted to put a value on Conservation. Perhaps WWF's funds, in part, are guilt money - also a surrogate for action.

Bregha

The new Northern Mineral Policy (DINA, 1986) includes a review of existing IBP sites. Reviews of migratory bird routes and of the Thelon Game Sanctuary are also involved. There is a two-year deadline on the reviews but it is not clear what is expected in that time. DINA is the lead agency. ACUNS should press DINA on the objectives of the review and the process.

Conclusion

At the conclusion of the meeting it was agreed that:

1. For funding, group or agency priorities and other reasons no clear leader in the Arctic Heritage field has emerged to promote and coordinate an overall effort.

2. ACUNS should send a letter of support to IUCN offering to participate in the work of a Task Force set up by that body, which because of its international connections and the work of its National Parks and Protected Areas, Environmental Planning, Ecology and other Commissions, was in an advantageous position to lead in the Arctic.

3. A letter should be sent to the Department of Indian and Northern Affairs (Canada) and other appropriate parties offering ACUNS participation in the establishment and work of an advisory committee which should be set up to aid in the review of mineral policy and heritage areas.

Copies of the letters in regard to (2) and (3) are in the appendices.

4. Each year ACUNS should make every effort to encourage theme or specialty meetings like this one on Arctic Heritage at its Annual General Meeting.

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APPENDIX A

LIST OF INVITEES

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APPENDIX B

May 5, 1987

Dr. Kenton Miller,
Director General,
International Union for Conservation of Nature
and Natural Resources,
1196 Gland, Switzerland

Dear Dr. Miller,

Following a recent workshop on the recommendations of the Arctic Heritage Symposium, the Board of Directors of ACUNS voted to support the establishment of a Task Force on Arctic Affairs by IUCN. It is envisioned that this Task Force would include representatives of the IUCN Commission plus other appropriate scientists and scholars. ACUNS would be interested in co-operating with this Task Force and in having a representative on the Task Force.

Harold Eidsvik was at the workshop and is aware of the motion and our interest in the work of the Task Force. If we can assist further in this matter, please call on us.

Sincerely yours,

Marc-Adélard Tremblay,
President

APPENDIX C

May 12, 1987

Mr. Julian T. Inglis,
Office of Conservation & Environmental Policy,
Department of Indian and Northern Affairs,
Ottawa, Ontario K1A OH4

Dear Mr. Inglis,

In accordance with the agreement at the Arctic Heritage Follow-up Meeting on April 29 in Toronto, we are writing to recommend that an expert advisory committee be created to assist in any review of the northern IBP sites under the proposed new Mineral Policy. Such an advisory committee would assist in the design of the aims, criteria and procedures for any IBP area review as well as in the conducting of the review. The advisory committee would also comment on the final report before official consideration by the federal or territorial governments. In this way the advisory committee could provide the knowledge needed to make any IBP review as informed and effective as possible.

ACUNS could assist in the creation of an advisory committee which should consist not only of persons knowledgeable in biology and other relevant sciences and in land use and land management, but also very familiar with the North. An advisory committee should only be set up after consultation with relevant northern groups such as the Science Institute of the N.W.T. and the native organizations.

We would be pleased to discuss these matters further with you.

Sincerely yours,

Marc-Adélard Tremblay, President

FUR FASHIONS WITH A NORTHERN FLAIR

Commentary by Jill Oakes

Department of Clothing and Textiles, Faculty of Human Ecology
University of Manitoba, Winnipeg, Manitoba

Introductory note

Preceding the Annual ACUNS/AUCEN banquet a fashion show was staged by Inuit from the Keewatin Region. The following is a description of the show. Readers may wish to consult the booklet "Inuit Annuraangit - Our Clothes" which is available from the Department of Clothing and Textiles, University of Manitoba, Winnipeg, Manitoba R3T 2N2, for $5.00.

Inuit culture is brought to life by Inuit people themselves in a living exhibition of skin clothing titled "INUIT ANNURAANGIT: Our Clothes". The exhibition opened in Eskimo Point and travelled to Rankin Inlet, Iqaluit (Frobisher Bay), Cambridge Bay, Yellowknife, Winnipeg, Ottawa, Montreal and to the annual ACUNS meeting in Toronto. The last shows will be held at the Winter Olympics '88 in Calgary and the Winter Cities '88 Conference in Edmonton. Museums, cultural institutes, schools and community halls were used for the display. In Toronto, the cultural fashion show was held at the ACUNS reception in Oakham House.

Sally Karetak travelled with the show as assistant co-ordinator and model. Other models were local people who enthusiastically volunteered to participate in the event. In Toronto, the models included a well known carver, David Ruben Piqtoukun; David's sister, Freda Lester (Inuvik); Freda's Uncle Tom Gordon; Sara Muxford Pitseolak and her boys, Michael and Christopher; and Kimura Tomoko and her girls, Keiko and Noreko.

Models of all ages wear caribou and seal skin parkas made by Mackenzie Delta, Copper, Netsilik, Igloolik, Keewatin and south Baffin Island Inuit seamstresses. Agnes Nigiyok (84 years old) made a replica of a Holman Island style worn in the early 1900's. Agnes remembered when "We wore only skin clothing when I was little, no calico, no canvas or anything else. No tea, just meat and gravy".

Each garment is made using techniques passed down from one generation to the next. Skins are softened by hand, cut using hand-eye measurements, and hand sewn. The result is an elegant garment that is more useful in the arctic winter than ready-made winter apparel.

A wide variety of fashions selected from each Canadian Arctic region are included in the travelling fashion show. "In the old days, Inuit could tell where someone was from by looking at their skin clothing styles", explained Ulayok Kaviok from Eskimo Point. Each parka contains a fascinating social history which is unveiled to the audience.

June Klengenberg, Holman Island, included a parka style introduced to the Coronation Gulf by Captain Klengenberg's wife (Kenmek) in 1916. Captain

Klengenberg was a whaler in the Western Arctic and at the turn of the twentieth century the whaling industry collapsed. The shift from whaling to trading inspired Captain Klengenberg to convert his ship into a floating trading post and move his family eastward. Kenmek and her eldest daughter dressed the family in their traditional Point Hope, Alaska, styles which soon became popular with the Inuit in the Coronation Gulf. Today, this style is worn by men, women and children of all ages.

Tiny, geometric pieces of light- and dark-haired caribou skin are sewn together, forming a quilt-like band of trim. This trim is sewn along the hemline, sleeve seams, hood seams and inserted across the front and back chest. The women's version of this colourful parka style has a glorious sunburst fur ruff. The ruff is made by sewing small pieces of wolf to a stiff backing, creating a halo effect. The face is framed with luxurious fur from wolverine; a prestigious fur in the Western Arctic. An amazing amount of work is involved in making this style, nevertheless it is used for hunting, playing, and special occasions.

The collection of parkas from the Central Arctic (Gjoa Haven area) illustrates how the western style is slowly spreading further eastward. Wolverine are scarce in this area, therefore seamstresses use muskox and dog skins as a substitute in order to create the Western Arctic image. Inuit in the Central Arctic also wear a variety of styles introduced by Caribou and Igloolik Inuit in the east.

Parkas embellished with beads were worn by both sexes in the early 1900's. Today, beadwork is sewn only to women's and girls' clothing. The lavishly beaded parka included in the exhibit was made by three women in the Keewatin in 1930. The beadwork was passed down to Rhoda Karetak, Rankin Inlet, who recently remounted the beaded panels on a fabric parka. The new parka is pouchless and has a long back tail which is tied up. This style was commonly worn by childless, unmarried women and is very seldom used today. Once a young woman reached puberty or had a child the strings were cut on her parka, allowing the back tail to drop.

Beaded fringes decorate the front, hood and shoulders of the Karetak's family heirloom. A caribou tooth is attached to the end of each fringe, creating a soft, melodic chime each time the model moves through the maze of admiring eyes. A tiny hole was drilled in each tooth by Winnie Crawford. Winnie recalls using a mouth drill with a small, triangular needle as a "drill bit". Mary Meeko, Eskimo Point, advises "... mouth drills are still the best way of making holes in caribou teeth".

Women with children wear a parka with a built-in carrying pouch. Models wearing these parka styles quickly filled the pouch with a toddler borrowed from a friend or surprised mother from the audience. Traditionally, Eastern Arctic women from Baffin Island wore parkas with long tails. A modern style with a broad, cape-like hood and a skirt-like hemline, made by Mary Battye from Pangnirtung, is also included in the show. The new hemline style has spread to northern Baffin Island and the Keewatin.

Across the Arctic, toddlers are instantly transformed into cuddly, bear-like creatures when they slip into their caribou skin snowsuit. The snowsuit has a split crotch to enable easy elimination without getting undressed. This

design feature was a blessing to busy mothers who wanted their child's snowsuit to last as long as possible.

Youngsters wear a variety of styles depending on the season, region and personal needs. Young models thoroughly enjoy showing off key features of each garment. They steal the show with their candid antics and cuddly innocence.

The exhibition concludes with a drum dance. Tom Gordon, originally from the Mackenzie Delta, burst into the ACUNS reception drumming and wearing the newest in skin clothing ... caribou skin "hot pants". Tom was flanked by beaming models wearing fur fashions from across the Canadian Arctic. Sally Karetak summed up the feeling expressed by many Inuit who participated in the show across Canada. "By being involved with this exhibition I have become interested in learning to make my family's skin clothing style. It makes us feel proud to be an Inuk when we see so many people interested in our culture. Thank you, it feels great."

Author's biography and sponsors

The exhibition was collected, curated and co-ordinated by Jill Oakes as an outcome of her Ph.D. field research in skin clothing with the Department of Clothing and Textiles, University of Manitoba. The clothing will return to Eskimo Point where it will be kept in a museum proposed by Inuit Silattuqsarvingat. Sally Karetak acted as assistant co-ordinator throughout the show and will be the curator in Eskimo Point.

The following individuals and organizations are a few of the many sponsors and all are thanked for their generous donation of time and money. Northwest Territorial Airways, Calm Air, First Air, Keewatin Air, Pacific Western Airlines Ltd., Explorations Program of the Canada Council, Cultural Initiatives Program, Departments of Renewable Resources, Indian and Northern Affairs, Culture and Communications, Economic Development and Tourism, Prince of Wales Heritage Centre, Inuit Cultural Institute, Association of Canadian Universities for Northern Studies, Mrs. Steinkopf and Dr. R. Riewe made this exhibition feasible. Support and encouragement from Inuit seamstresses, models and backstage supporters brought the show to life and the enthusiastic acceptance from audiences across Canada made each performance a success. Their support is gratefully acknowledged.

Captions (See pages 183 & 184)

Figure 1: The Western Artic Inuit wear a caribou skin parka elaborately decorated with wolverine,wolf and geometric trim. Ulayok Kaviok models the parka made by June Klengenberg in Coppermine.

Photo credit: Rick Riewe, 1987.

Figure 2: This modern parka style, modelled by Iga Muckpa, is commonly seen in the Keewatin and Baffin Island area. The style was originally made by Inuit on southern Baffin Island.

Photo credit: Rick Riewe, 1987.

Figure 3: Sarah Muxford (Pitseolak) demonstrated how to remove a baby from her parka's carrying pouch at the reception in Oakham House.

Photo credit: Glen Ou, 1987.

Figure 4: The early 1900's Holman Island style replica was modelled by Sarah Muxford (Pitseolak) while Keiko Tomoko shows off a parka from Gjoa Haven.

Photo credit: Glen Ou, 1987.

Figure 5: David Ruben Piqtoukun caught the audience's attention in a thick-haired parka made in Pangnirtung by Mary Battye.

Photo credit: Glen Ou, 1987.

Figure 6: The cultural fashion show finished with a drum dance. Over dinner with the ACUNS delegates, the models said it was great to see so many people interested in their culture.

Photo credit: Glen Ou, 1987.

Figures 1 and 2

Figure 3

Figures 4 and 5

Figure 6

ACUNS ANNUAL REPORTS

LES RAPPORTS ANNUELS DE L'AUCEN

ASSOCIATION OF CANADIAN
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RAPPORT DU PRÉSIDENT POUR L'EXERCICE 1986-87

ASSEMBLÉE ANNUELLE DU 2 MAI 1987 AU RYERSON POLYTECHNICAL INSTITUTE, TORONTO

Introduction

C'est avec plaisir qu'en ouvrant mon rapport je souhaite la bienvenue au membre le plus récent de l'AUCEN, l'Université de Victoria. L'Association tout entière se réjouit d'accueillir en son sein une autre grande université.

Le très haut niveau des activités de l'AUCEN au cours de l'année passée apparaît clairement à la lecture, même rapide, du programme de notre Assemblée annuelle à l'Institut Ryerson, à laquelle nous allons participer.

Cette Rencontre débute par un Atelier organisé par M. Gordon Nelson, afin de donner suite à la Conférence sur le patrimoine de l'Arctique, qui s'est déroulée en 1985 à Banff. L'Association vient juste de publier le Compte-rendu (G. Nelson et coll., 1987) de cette rencontre, qui a réuni des participants venant d'une douzaine de pays environ.

C'est une journée d'étude qui suivra jeudi, à l'initiative du NOIR. Ce Groupe des ressources documentaires sur le Nord et les régions marines s'était réuni dans le cadre de notre Rencontre de l'an dernier à Yellowknife, et le Compte-rendu de cette réunion forme une section importante de l'ouvrage: Education, Research, Information Systems and the North (W.P. Adams, 1987) que l'Association a publié il y a quelques semaines. L'AUCEN/ACUNS accorde un intérêt constant aux réseaux documentaires nordiques, depuis qu'elle s'est efforcée de remplacer l'Arctic Bibliography par un réseau documentaire spécialisé accessible dans tout le pays. Je suis certain que ce thème réapparaîtra lors de nos Assemblées annuelles.

Au cours de la séance de jeudi après-midi de notre Conférence, deux organes de l'AUCEN doivent se réunir. L'un est le Comité des bourses en développement économique autochtone, et l'autre le Groupe des universités subarctiques. Le premier, sous la présidence de M. John Stager, administre le programme de bourses destinées aux étudiants autochtones entreprenant des études de second cycle en matières économiques. Le rapport de M. Stager sera présenté séparément lors de notre Rencontre. En ce qui concerne le Group des quatre ou cinq universités membres de l'AUCEN qui fonctionnent en région subarctique, l'Association publiera sous peu le Compte-rendu (W.P. Adams et D. Parker 1987) de leur première Rencontre, qui s'est déroulée l'été dernier I Sudbury.

La "Technologie et le Nord" sera le thème d'une séance organisée par M. Frank Duerden de l'Institut Ryerson, et qui se déroulera vendredi. Les communications qui y seront présentées portent sur la technologie et les répercussions de son emploi sur l'environnement. C'est là l'effort le plus récent de l'Association pour proposer une thème de réflexion aux Assemblées annuelles.

Vendredi soir, l'honorable Bill McKnight, Ministre des Affaires indiennes et du Nord canadien parlera, nous l'espérons, du contenu du rapport sur l'institut polaire national envisagé (Le Canada et la science polaire). L'AUCEN/ACUNS a consacré beaucoup de temps et d'efforts à l'enquête publique qui a débouché sur ce rapport.

Le thème des "sciences polaires" sera repris lors de la séance de samedi matin, alors que les conférenciers et un groupe d'experts évalueront les progrès réalisés dans les sciences nordiques, et les besoins de la recherche pertinente.

Le point culminant de notre Rencontre sera atteint, vers la fin de la matinée, lors d'une allocation de M. Trevor Lloyd, fondateur de notre Association. Il récapitulera les années qui ont précédé et immédiatement suivi cette fondation. Ses observations devraient être particulièrement intéressantes dans le contexte des sciences polaires et des autres questions débattues précédemment au cours de la Rencontre.

Lors du déjeuner-débat, samedi, les participants rencontreront le Comité du Programme de formation scientifique dans le Nord, en vue de faire l'analyse critique annuelle et publique de cet important Programme. L'Association continue à oeuvrer de concert avec ce Comité, et a publié un exposé détaillé à son sujet dans le Compte-rendu de la Rencontre de Yellowknife, tout en militant en faveur du Programme au cours de l'année passée.

Ainsi le programme de notre Assemblée annuelle reflète-t-il l'ampleur et la diversité des activités de l'Association pendant l'exercice écoulé. Une récapitulation plus systématique de ces activités au cours des douze mois dont il s'agit nous fournira un autre point de vue sur la répartition des efforts et des ressources de l'Association.

L'Exercice écoulé

Notre Assemblée annuelle de 1986 à Yellowknife a obtenu un grand succès et les suites qu'il fallait lui donner ont exigé beaucoup de temps et d'efforts. J'ai déjà mentionné les Compte-rendus que nous avons délibérément étoffés afin d'en faire des ouvrages pratiques de référence, réellement utiles aux Nord-Canadiens.

Nous avons aussi entrepris de donner suite aux propositions faites à la Rencontre de Yellowknife. Par exemple, nous avons distribué une liste de projets de recherches souhaitables, mentionnés par des groupes nordiques, nous avons collaboré le plus largement possible avec l'Institut scientifique des Territoires du Nord-Ouest et nous avons demandé à joindre l'Association des universités et collèges du Canada à titre de membre associé, ce qui a été accepté. Cette dernière démarche, vous vous en souvenez, nous a été proposée en vue d'accroître l'efficacité de notre fonction de truchement entre les Nord-Canadiens et le secteur universitaire en général.

En juin de l'an dernier, nous avons organisé une rencontre des universités subarctiques à l'Université Laurentienne, comme je l'ai mentionnée précédemment. Ces établissements d'enseignement supérieur donnent suite aux décisions prises alors.

Plus tard, en novembre, nous avons mis sur pied la première Conférence nationale des étudiants en Études nordiques. Grâce au très large soutien du Ministre des Affaires indiennes et du Nord canadien, cette Conférence a été couronnée de succès. Plus de 120 comunications y ont été présentées par des étudiants venus de plus de 30 universités et du Nord du pays. Presque toutes les disciplines nordiques y étaient représentées. Le Compte-rendu de cette rencontre sera publié plus tard dans l'année. Nous avons déjà obtenu l'accord du Ministre pour la convocation d'une seconde conférence, tard en 1988.

Pendant ce temps, la Fiduciaire canadienne d'Étude nordiques, y compris le Comité des bourses en développement économique autochtone déjà mentionné, a continué sa campagne de recueil de fonds et ses programmes d'allocation de bourses. Un montant de 50 000 $ a été attribué cette année pour des bourses d'études et des bourses spéciales, outre le montant de 100 000 $ réservé au programme de bourses en développement économique autochtone. M. Gordon Nelson présentera séparément le rapport sur les activités de la Fiduciaire.

En sus de ces rencontres et activités, l'Association a poursuivi son action permanente de plaque tournante pour l'information spécialisée, de publication de Point Nord/Northline en rehaussant la qualité de ce Bulletin, de pressions auprès des responsables (au sujet de la Politique des sciences et de la technologie, contre la compression des budgets du Conseil national de recherches du Canada, du Conseil de recherches en sciences naturelles et en génie, et du Programme de formation scientifique dans le Nord, contre la fermeture de l'Ambassade du Canada en Finlande), etc.

L'étau budgétaire

On imagine difficilement qu'un organisme de notre faible taille puisse mener une plus large gamme d'activités, à un niveau de qualité supérieur. C'est pourquoi nous avons été atterrés d'apprendre, par un avis transmis en février, que le financement de base de l'Association était réduit de 44 pour cent. Cette nouvelle, nous parvenant sept semaines seulement avant la fin d'un exercice financier qui avait débuté par les lourdes dépenses de la Rencontre de Yellowknife, nous a coupé le souffle pendant quelque temps! Mais nous avons rassemblé notre courage pour essayer de résoudre le problème. J'ai pu rencontrer en face à face le Sous ministre associé et le Ministre des Affaires indiennes et du Nord canadien. À la suite de ces entretiens, la compression budgétaire a été malheureusement maintenue, mais j'ai obtenu qu'elle soit étalée sur quatre ans, la réduction la plus forte, soit 17 pour cent, sera imposée la première année. Ce pourcentage constitue encore une amputation notable de notre financement de base mais, au moins, nous laisse quelque temps pour nous préparer aux années de vaches maigres qui viennent.

Le conseil d'administration estime que l'Association peut s'adapter à une telle compression, à condition de resserrer les dépenses de fonctionnement, et aussi de rechercher énergiquement de nouvelles sources de financement.

Nous avons introduit sans délai certains changements, et pris un certain nombre de décisions au sujet du fonctionnement de l'Association au cours de l'année qui vient. Et nous allons présenter quelques propositions au Conseil, lors de l'Assemblée annuelle.

Voici les principales actions que nous avons entreprises ou que nous proposons d'entreprendre. Il est important de présenter cette vue synoptique, car elle donne le contexte des propositions présentées au Conseil, et particulièrement de l'augmentation des cotisations. Il faut garder à l'esprit que nous nous efforçons de faire face à la compression de cette année, et aussi de nous préparer pour les réductions encore plus pesantes de l'année prochaine.

Mesures permettant de faire face à une compression du budget de l'AUCEN étalée de 1987 à 1991

A. Conseil d'administration

1. Étudier le remplacement d'une réunion du conseil d'administration par une téléconférence.
2. Demander au Comité des mises en candidature de faire savoir aux candidats au conseil d'administration que le recueil des fonds constituera un élément important de leur mandat.

B. Publications

1. Publier Point Nord/Northline pour environ 14 000 $/an. Cette activité comprendra l'élaboration et la rédaction internes du bulletin, dont les dépenses de traduction ne devront pas dépasser 500 $. Les textes seront en général publiés dans leur langue de rédaction. Il faudra également renégocier avec Nortext les termes de son contrat, afin de réduire de moitié environ les frais de préparation du numéro d'avril 1987.
2. Toutes les publications prévues devraient, comme les autres projets, se faire sur la base d'un financement préliminaire, avec récupération des frais, y compris les frais administratifs pertinents.

C. Conférences et activités similaires

1. Toutes les activités autonomes ne devront être entreprises qu'avec un financement préliminaire, y compris les frais administratifs pertinents.
2. La prochaine conférence nationale des étudiants devra être administrée dans le cadre d'un accord soigneusement négocié, à élaborer sans tarder.

D. Fiduciaire canadienne d'Études nordiques

La Fiduciaire fonctionne grâce à un budget de base maximal de 4 000 $/an, y compris les coûts de la publicité et d'une réunion annuelle. Elle pourrait acquitter des dépenses plus élevées en prélevant leur montant sur les fonds qu'elle recueille.

E. Comités

C'est seulement quand le financement d'un projet déterminé sera disponible que les dépenses du comité correspondant seront acquittées. On encouragera les comités à se réunir de préférence lors de l'Assemblée annuelle.

F. Conseil

1. Continuer à percevoir un droit d'inscription à l'Assemblée annuelle.
2. Organiser le déroulement de l'Assemblée annuelle dans le cadre d'un budget de 17 500 $. Il faudra donc ne rembourser que les frais de voyage essentiels des membres du conseil d'administration et du Conseil de l'AUCEN.
3. Retarder l'Assemblée annuelle de 1988-89 jusqu'à l'automne de 1988, comme première étape vers la fixation de sa convocation à la fin de l'exercice financier (l'Assemblée suivante se déroulerait au printemps de 1990). Cette modification aurait, comme avantage additionnel, de permettre au Conseil d'assister à la prochaine Conférence des étudiants en Études nordiques, et peut-être de faire des économies.
4. Réunir les Assemblées annuelles dans des endroits peu coûteux.
5. Accroître de 5 pour cent par an les cotisations universitaires, pendant trois ans à dater de 1988-89.

G. Recherche dynamique d'autres fonds

Il faudra inscrire cette ligne de force dans le cadre des activités fondamentales de l'AUCEN, de son conseil d'administration, de son Conseil et de ses employés. L'effort devra couvrir d'autres sources à l'intérieur de l'AIN, d'autres ministères fédéraux, les administrations territoriales et autres, et le secteur privé. Le nouveau directeur général devra réserver le temps nécessaire à cette recherche (ainsi que pour accomplir ses nouvelles tâches concernant Point Nord/Northline, etc.).

H. Création d'un compte "Financement de base"

Tous les fonds non affectés seront versés dans ce compte et utilisés, comme le conseil d'administration le jugera à propos, pour les seules dépenses de base. Celles-ci concernent l'agent d'administration, le Bureau, le directeur général, l'Assemblée annuelle, Point Nord et le conseil d'administration. Il s'agit d'accumuler des fonds d'avance pour l'exercice financier à venir.

Observation finale

C'est avec regret que j'ai dû conclure mon rapport sur une année exceptionnellement productive par l'annonce de pénibles restrictions financières. Cependant, j'estime que l'AUCEN/ACUNS, après dix années d'existence, est maintenant capable, non seulement de surmonter ces difficultés, mais encore de les dépasser pour atteindre des objectifs plus élevés.

Je remercie de tout coeur les membres du conseil d'administration, qui m'ont accordé leur soutien constant au cours des deux dernières années. Trois de ces membres, MM. Garry Clarke, de l'University of British Columbia, Gordon Nelson, de l'University of Waterloo, et Peter Schledermann, de l'University of Victoria, quittent le conseil d'administration cette année. Leur apport au fonctionnement de l'AUCEN/ACUNS a été considérable.

le 1 er avril 1987 Marc-Adélard Tremblay

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PRESIDENT'S REPORT 1986-87

ANNUAL MEETING, RYERSON POLYTECHNICAL INSTITUTE, TORONTO, 2 MAY 1987

Introduction

I am pleased to begin this report by welcoming the University of Victoria as ACUNS' newest member. We are delighted that another major university has joined us.

Even a casual reading of the program for the Ryerson meetings at which this report will be presented, gives a clear impression of the very high level of ACUNS' activity during the past year.

Our meetings begin with a workshop, organized by Gordon Nelson, designed to follow up on the Arctic Heritage Symposium which we held in Banff in 1985. We have just published the proceedings (Nelson et al. 1987) of that symposium which involved a dozen or so countries.

Then, on the Thursday, we continue with a day-long seminar of the Northern and Offshore Information Resources organization. This 'information systems' group met as a part of our Yellowknife conference, last year. Their proceedings from Yellowknife form a major section in Education, Research, Information Systems and the North (Adams, 1987) which we published a few weeks ago. ACUNS/AUCEN has an ongoing interest in northern information systems which goes back to its efforts to replace the Arctic Bibliography with some sort of a nation-wide information system. This is a topic which, I am sure, will surface elsewhere during our annual meetings.

During the afternoon of the Thursday of our conference, two ACUNS groups meet. One is the Native Economic Development Scholarship Committee, the other the 'Subarctic Universities' group. The former, chaired by John Stager, manages our scholarship program designed to assist native students undertaking graduate work in business programs. Dr. Stager's report will be presented separately at Ryerson. The latter meetings involve the four or five ACUNS/AUCEN universities which operate in remote areas, which met together for the first time in Sudbury last summer. We will be publishing the proceedings of these meetings (Adams and Parker, 1987) soon.

On the Friday, the principal theme is 'Technology and the North', a session organized by Frank Duerden of Ryerson. Papers presented will deal with 'technology' and the impact of technology. This is the latest of our attempts to make use of the annual meetings to address a meaningful theme.

On Friday evening, the Hon. Bill McKnight, Minister of Indian and Northern Affairs, will, we hope, address the contents and implications of the 'national polar institute report' (Canada and Polar Science). ACUNS/AUCEN devoted a good deal of time and energy to the inquiry which resulted in this report.

The 'Polar Science' theme will be taken up again on Saturday morning when speakers and a panel will address the present state and needs of science in the North.

The culmination of our meetings, at the end of Saturday morning, will be an address by Trevor Lloyd, founder of ACUNS. Dr. Lloyd will look back to the years before and immediately after the founding of the Association. His remarks should be particularly interesting in the light of the Polar Science and other topics dealt with earlier in the meetings.

At the working lunch on Saturday, we will meet with the Northern Scientific Training Program Committee for the annual public review of that important program. We continue to work with this Committee and we published an extended account of it in the Yellowknife proceedings and lobbied for it during the past year.

Thus, the program of our annual conference reflects the level and variety of activity of the Association throughout the year. Looking back over the twelve months in a more systematic fashion provides us with another view of the allocation of our energies and resources.

The Year

Our 1986 annual meetings in Yellowknife were a great success and follow-up to them has occupied a great deal of time and effort. I have already mentioned the proceedings which we deliberately developed as a practical source book which would be of real value to Northerners. We have also tried to begin to follow up suggestions made in Yellowknife. We have, for example, circulated 'wish lists' of research projects provided by northern groups, we have tried to cooperate as much as possible with the Science Institute of the Northwest Territories and we applied for and received Associate Membership in the Association of Universities and Colleges of Canada. This last, you may remember, was a step suggested to us as one way of increasing our effectiveness as a link between Northerners and the university 'system' in general.

In June, last year, we organized the meeting of subarctic universities at Laurentian, which I mentioned previously. The universities concerned are following up on this.

Then, in November, we organized the first National Student Conference on Northern Studies. With the considerable support of the Minister of Indian and Northern Affairs, this event was a great success More than 120 papers were presented by students from over 30 universities and the North. Virtually every 'northern' discipline was represented. The proceedings will be published later this year. We have already obtained the agreement of the Minister for a second such conference to be held late in 1988.

Meanwhile our Canadian Northern Studies Trust, including the Native Economic Development Scholarships group mentioned above, continued its fundraising efforts and its awards programs. We awarded $50,000 worth of Studentships and Special Awards this year, in addition to the $100,000 in the Native Economic Development program. Gordon Nelson will report on the Trust separately.

In addition to these major events and activities, the Association continued its ongoing activities, acting as an information clearing house, publishing Northline/Point Nord as a high quality newsletter, lobbying (about Science and Technology policy, about NRC, NSERC and NSTP cutbacks, and the proposed closing of the embassy in Finland), etc. etc.

A financial shock

It is difficult to imagine an organization of our size operating at a higher level in terms of both quality and quantity of activities. We were therefore particularly shocked when we received notice, early in February, that our core funding was to be cut by 44%. This news, only seven weeks before the end of a financial year which began with the great expense of the Yellowknife meetings, stunned us for a while! We soon rallied to tackle the problem and I was able to meet personally with both the Associate Deputy Minister and the Minister. As a result, unfortunately, the cuts were not reduced but they were spread over four years with the largest reduction, 17%, in the first year. This still represents a substantial change in our base funding but it does give us time to prepare for lean years ahead.

The Board feels that the Association can cope with these changes in funding but only if we both tighten up the operation and aggressively seek new sources of funds.

We implemented some changes immediately, we have made a number of decisions about the Association's operations for next year and we are placing some proposals before Council at the annual meetings.

The following are the main actions which we have taken or which we propose to take. This overview is important as it provides a context for motions which are before Council, especially the proposed increase in dues. It should be borne in mind that we are trying to cope with this year and prepare for the even larger cuts of next year.

Measures for dealing with a phased reduction of the ACUNS budget, 1987-91

A. Board

1. Consider replacing one Board meeting with a Conference call.
2. The Nominating Committee to be directed to advise prospective Board members that fundraising will be an important part of their mandate.

B. Publications

1. Produce Northline for ca. $14,000 p.a. This will involve inhouse producing and writing with a translation budget of no more than $500. Material will generally be published in the language of submission. Also, if possible, renegotiate the contract with Nortext to produce the April 1987 issue, to reduce costs by approximately a half.
2. All planned publications should, like other projects, be on an upfront funds, cost recovery basis, with office overhead built in.

C. Conferences and other activities

1. All 'project' type activities to be run with upfront funds only, with office overhead built in.
2. The next National Student Conference should be run on a carefully negotiated agreement, to be developed soon.

D. Canadian Northern Studies Trust

The Trust to operate on a maximum core fund budget of $4,000 p.a. including cost of advertising and one meeting per year. It may spend in excess of this from funds which it raises.

E. Committees

Committee expenses only to be provided where funds become available for a particular project. Committees to be encouraged to meet at annual meeting.

F. Council

1. Continue the practice of charging a registration fee for the annual meeting.
2. Run the annual meeting on a $17,500 budget. This will involve paying only basic travel costs for Board and Council.
3. Delay 1988-89 annual meeting until the fall of 1988, as a step towards moving the meetings to the end of the financial year (the next meeting would be spring 1990). This would also have the advantage of allowing Council to attend the next National Student Conference on Northern Studies, with possible savings.
4. Run the annual meetings at 'cheap' locations
5. A 5% per annum increase in universities dues for the next three years, beginning in 1988-89.

G. ACTIVELY SEEK FUNDS ELSEWHERE

This will have to be fully built into the core activities of ACUNS, its Board, Council and employees. The search should include other DINA sources, other federal ministries, Territorial and other governments, and the private sector. The new Executive Director must have time for this (as well as new duties re Northline, etc.).

H. ESTABLISH A "CORE FUND" ACCOUNT

All non-allocated funds will be placed in this account to be used, at the discretion of the Board, for 'core' payments only. 'Core' here means the Administrative Officer, the office, the Executive Director, the Annual Meeting, Northline and the Board. The idea here would be to accumulate funds in advance of a financial year.

Concluding Remarks

I am sorry to have to end my report on such a productive year with this sad financial news. However, I do believe that ACUNS/AUCEN, after ten years of existence, is now capable not only of surviving these changes but of rising above them to greater things.

I am most grateful to my Board for their continued support during the last two years. Three members, Garry Clarke of U.B.C., Gordon Nelson of Waterloo, and Peter Schledermann of Victoria, retire from the Board this year. Their contributions to ACUNS/AUCEN have been considerable.

Marc-Adélard Tremblay
1 April 1987

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ASSOCIATION OF CANADIAN
UNIVERSITIES FOR NORTHERN STUDIES

ASSOCIATION DES UNIVERSITAIRES
CANADIENNE D'ETUDES NORDIQUES

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EXECUTIVE DIRECTOR
W P Adams

EXECUTIVE DIRECTOR'S REPORT, 1986-87

ANNUAL MEETING, RYERSON POLYTECHNICAL INSTITUTE, TORONTO, 2 MAY 1987

This has been an exciting and productive year for ACUNS/AUCEN, despite the last minute reduction in core funds which is fully documented in the President's repo :.

The 'new' year began for us with the wind down and follow through from the meetings in Yellowknife. These formed the most elaborate annual conference that the Association had ever held. During the year we went to great lengths to ensure that the proceedings, Education, Research, Information Systems and the North would be of lasting value to Northerners and others. In the event, the published volume contains a great deal more than simply papers from the meetings. Indeed, each of the major Sections of the book is something of a resource in itself. These Sections are: Education and Research and the North, Higher Education and Training in the North with a focus on Arctic College, Teacher Education in the North, Distance Education and the North, Information Systems and the North, and The Universities of Canada and the North - a Guide. The Teacher Education Section contains a good deal of the work of the late Jack Cram, of McGill, who co-chaired that session at Yellowknife. Its coverage, beginning with circumpolar and national overviews and continuing with case examples from Labrador, through northern Quebec and Manitoba, to the Northwest Territories, is a good illustration of the scope of other Sections. I am most grateful to those Council Members who contributed to the 'Guide' section which will be of great use to students and others for several years to come.

We also followed up on Yellowknife in other ways. We carefully circulated selected papers from the meetings to interested parties - engineering material to Deans of Engineering, papers on women's issues to Women's Studies Groups, biological material to Chairs of Biology, etc. This activity included the production of an insert for Northline/Point Nord containing a 'wish list' of research projects produced by Public Works, GNWT. We continue to cooperate with the Science Institute of the NWT as it steadily establishes itself.

The principal ACUNS event of the 1986 summer was the Conference of Subarctic Universities at Sudbury, 13-14 June. It was attended by more than 60 persons from the four universities concerned - Lakehead, Laurentian, Université du Québec à Chicoutimi and Université du Québec en Abitibi-Témiscamingue. Three of the four Presidents attended to sign a protocol for future cooperation. A brief report appeared in Northline/Point Nord, Vol. 6, No. 3 (summer 1986). These universities, joined by Memorial, will hold follow-up meetings at Ryerson as part of ACUNS/AUCEN annual conference. The proceedings are in press. They were edited by Doug Parker, of Laurentian, and myself.

The highlight of a busy year was the first National Student Conference on Northern Studies (18-19 November 1986). This is described in some detail in Northline/Point Nord, Vol. 7, No. 1 (January 1987). The number and variety of students attending and presenting papers were most encouraging, in terms of university affiliation and discipline. The principal sponsors were the Minister of Indian and Northern Affairs, NSERC, Health and Welfare Canada, the University of Ottawa and Carleton University. The Minister, the Hon. Bill McKnight, attended the meetings and was most supportive throughout. The Conference was organized by a committee of students from the two Ottawa universities, chaired by Dr. Peter Johnson of the University of Ottawa. They are to be congratulated on a fine piece of work. Johnson and I are in the process of editing the proceedings, we are grateful to colleagues who have been refereeing papers.

We are delighted to report that the Minister, the Hon. Bill McKnight, has agreed to support a second student conference late in 1988. We are negotiating funds for this at present.

Gordon Nelson's Arctic Heritage volume, based on the 1985 Banff meetings, became available early in 1987. This is a very fine piece of work of which the Association can be proud. Recommendations from Banff have been followed up in various ways, they will be considered in a special meeting at Ryerson.

During the year, the office was also occupied in producing high quality issues of Northline/Point Nord. We have appreciated the support which various Council Members and the Board have given in providing material for publication. We have tried to make the newsletter readable and informative. We try to span disciplines, universities, regions, the international scene, etc. etc. in every issue. It is my impression that the publication is now being read by many of the more than 2000 people who receive it! We also supported the activities of the Canadian Northern Studies Trust and the Native Economic Development Scholarship Committee - raising funds, processing applications and organizing selection meetings. These activities are reported separately in the reports of the respective Chairmen.

I personally have been involved in the production of Canada and Polar Science, the report produced as a result of the Hon. David Crombie's enquiry into Canada's need for a national polar institute. At the time of writing, this report is in the Minister's hands. I hope that it will be made public at the Ryerson meetings so that ACUNS can respond to it.

I have continued to visit member universities and to attend conferences on behalf of the Association. It is my impresion that there is a perceptible increase in Northern Studies activity on our campuses. I think that the National Student Conference helped. It is my view that ACUNS/AUCEN should never forget to devote resources to the student level. It was, for example, important that the Association strongly protested the reduction in the Northern Scientific Training Program - taking its protests to the Minister himself. That program is a keystone of student activity in northern research.

One of our themes during the year was the preparation of a short article, in English and in French, on ACUNS/AUCEN as a 'networking' organization. This summarizes the range of activities in which the Association is now involved. Copies are available on request.

I will be leaving my position as Executive Director of ACUNS/AUCEN this summer although I hope to keep up my contact with the Association. I have thoroughly enjoyed my spell in this position. I am most grateful to Marc-Adélard Tremblay and his Board for the continued support and trust. I am also grateful to all Council Members, and others, who have been so supportive during my stay. My greatest debt however, is to Eileen van Heyst. All of those who have had any real contact with ACUNS/AUCEN know that Eileen's contributions to its success are without price.

RAPPORT DU DIRECTEUR GÉNÉRAL POUR 1986-1987 ASSEMBLÉE ANNUELLE du 2 MAI 1987 au RYERSON POLYTECHNICAL INSTITUTE à TORONTO

L'exercice 1986-87 a constitué une année remarquablement féconde pour l'AUCEN/ACUNS en dépit de la réduction, au dernier moment, du financement de base de l'Association. Cette réduction est commentée par le Président dans son rapport.

Cette année d'activités a commencé par la culmination et l'épilogue de la Rencontre de Yellowknife. Celle-ci a donné lieu à la Conférence annuelle la plus complexe organisée jusqu'ici par l'Association. Au cours de l'année, nous avons fait de grands efforts pour assurer une valeur durable au Compte-rendu des délibérations: Education, Research, Information Systems and the North, pour les Nord-Canadiens et autres intéressés. De fait, le Compte-rendu publié contient bien plus que les seules communications présentées. Chacun de ses principaux chapitres constitute une source d'information en lui-même. Ces chapitres sont les suivants: l'Enseignement et la recherche et le Nord, l'Enseignement et la formation supérieur dans le Nord avec un accent spécial donné au Collège arctique, la Formation des enseignants dans le Nord, l'Enseignement à distance dans le Nord, les Réseaux documentaire et le Nord, et un Guide des activités universitaires touchant le Nord. Le chapitre traitant de la Formation des enseignants contient une large part des travaux du regretté Jack Cram, de l'Université McGill, qui a été co-président de la séance pertinente lors de la Rencontre de Yellowknife. Le contenu de ce chapitre, soit des vues d'ensemble aux plans circumpolaire et national, illustrées par des études de cas intéressant le Labrador, le Nouveau-Québec, le Manitoba septentrional et les Territoires du Nord-Ouest, montre l'envergure des autres parties. Je remercie vivement les membres du Conseil qui ont apporté leur contribution au "Guide des activités universitaires", qui sera fort utile aux étudiants et aux autres intéressés au cours des quelques années à venir.

Nous avons donné d'autres suites à la Rencontre de Yellowknife, en distribuant judicieusement le texte de certaines communications aux divers intéressés: les communications sur des problèmes d'ingénierie aux doyens des facultés de génie, les communications concernant les femmes

aux groupes d'études sur la condition féminine, les communications sur les questions biologiques aux titulaires des chaires de biologie, etc. Dans le même esprit, nous avons préparé un encart pour Point Nord/Northline contenant une liste de projets souhaitables de recherche, compilée par la Direction des travaux publics du Gouvernement des T.N.-O. Nous poursuivons notre collaboration avec l'Institut des sciences des T.N.-O. en vue d'un développement continu de ses activités.

La Conférence des universités médionordiques, réunie les 13 et 14 juin à Sudbury, a constitué le point saillant des activités de l'AUCEN au cours de l'été. Plus de 60 délégués venant des quatre universités intéressées y ont participé, soit des universités Lakehead et Laurentienne et des universités du Québec à Chicoutimi et en Abitibi-Témiscamingue. Trois des quatre présidents et recteurs ont, au cours de cette rencontre, signé un protocole de future collaboration. Un court exposé à ce propos figure dans Point Nord/Northline de l'été 1986, vol. 6, n^{o} 3. Ces universités, de même que l'Université Mémorial, y donneront suite lors d'une rencontre à l'Institut Ryerson, dans le cadre de la Conférence annuelle de l'AUCEN/ACUNS. Le Compte-rendu, préparé par M. Doug Parker de l'Université Laurentienne et moi-même, se trouve sous presse.

La première Conférence nationale des étudiants en Études nordiques, réunie du 18 au 19 novembre 1986, a été le point culminant d'une année très active. Cette Rencontre est décrite en quelque détail dans le numéro de janvier 1987 de Point Nord/Northline, vol. 7, n^{o} 1. Le nombre élevé des étudiants participants et auteurs de communications a été très encourageant, au point de vue de la diversité tant des disciplines que des universités d'origine. Les principaux parrains de cette Conférence étaient le Ministre des Affaires indiennes et du Nord, le Conseil de recherche en sciences naturelles et en génie, Santé et Bien-Être social Canada, l'Université d'Ottawa et l'Université Carleton. Ce Ministre, l'honorable Bill McKnight, a participé à la Conférence, à laquelle il a fourni un soutien constant. C'est un comité d'étudiants des deux universités d'Ottawa et Carleton qui, sous la présidence de M. Peter Johnson, de l'Université d'Ottawa, avait organisé cette rencontre. Nous complimentons le comité pour l'excellence de son travail. M. Johnson et moi-même préparons le Compte-rendu pour publication, et nous remercions nos collègues qui ont bien voulu faire l'analyse critique des communications.

Nous sommes très heureux de vous faire savoir que le Ministre, l'honorable Bill McKnight, a accepté de parrainer une seconde conférence nationale des étudiants, qui se réunira tard en 1988. Nous nous efforçons actuellement de réunir les soutiens financiers indispensables.

Le volume Arctic Heritage, préparé par M. Gordon Nelson à la suite de la Rencontre de Banff en 1985, a été publié au début de 1987. Il s'agit d'un excellent ouvrage, dont l'Association peut être fière. On a donné suite aux recommandations des participants de diverses façons, qui seront étudiées lors d'une séance spéciale lors de la rencontre à l'Institut Ryerson.

Au cours de l'année, le Bureau s'est aussi occupé de publier des numéros de Point Nord/Northline d'excellente qualité. Nous sommes très heureux de la collaboration de divers membres du Conseil et Conseil d'administration, qui ont fourni des matériaux pour publication. Nous nous efforçons de rendre ce bulletin aussi lisible et documenté que possible, et de couvrir, dans le même numéro, les activités des diverses disciplines, universités et régions, ainsi qu'au plan international. J'ai le sentiment que la plupart des 2 000 personnes qui reçoivent notre bulletin le lisent effectivement. Nous avons également soutenu les activités de la Fiduciaire canadienne d'Études nordiques et du Comité des Bourses d'études en développement économique autochtone: recueil de fonds, acheminement des demandes et organisation des séances d'évaluation des candidatures. Ces activités sont décrites séparément dans les rapports des présidents des comités pertinents.

J'ai personnellement participé à l'élaboration du rapport Le Canada et la science polaire, à la suite de la demande d'information de l'hon. David Crombie concernant l'intérêt d'un institut polaire national pour notre pays. Au moment où j'écris, le rapport se trouve entre les mains du Ministre. J'espère que ce rapport sera rendu public lors de la Rencontre à l'Institut Ryerson, afin que l'AUCEN puisse exprimer ses réactions.

J'ai continué mes visites aux universités membres, et ma participation à certaines conférences en vue d'y représenter l'Association. Il me semble que les activités d'Études nordiques sedéveloppent dans nos universités, et je crois que la Conférence nationale des étudiants y a contribué. J'estime que l'AUCEN/ACUNS ne devrait jamais négliger de consacrer des ressources au développement del'intérêt des étudiants pour ces études. Par exemple, il est important que l'AUCEN se soit adressée au Ministre lui-même pour protester contre la compression imposée au Programme de formation scientifique dans le Nord, car il s'agit de la cheville ouvrière des activités de recherches nordiques accomplies par les étudiants.

Au cours de l'année, l'un de nos thèmes, celui de la fonction de concertation interuniversitaire assumée par l'AUCEN, a débouché sur l'élaboration d'un article en français et en anglais, résumant la gamme d'activités entreprises actuellement par l'Association. Des exemplaires de cet article sont disponibles sur demande.

Je quitterai mon poste de Directeur général de l'AUCEN/ACUNS au cours de l'été, en espérant maintenir des liens avec l'Association. C'est avec grand plaisir que j'ai accompli les devoirs de ma charge, et je remercie M. Marc-Adélard Tremblay et les membres du conseil d'administration pour le soutien et la confiance qu'ils m'ont accordée. Je remercie également tous les membres du Conseil de l'Association et les autres personnes qui m'ont donné leur aide au cours de mes activités de directeur général. Toutefois, c'est envers Mme Eileen van Heyst que j'ai la plus grande dette. Tous ceux qui ont eu un contact direct avec le Bureau de l'AUCEN savent l'ampleur de la contribution inestimable de Mme van Heyst aux succès de l'Association.

W. Peter Adams
1er avril 1987/April 1, 1987

ADDENDUM

Miscellaneous Activities since Board Meeting of 18 April 1986

Attended

Various meetings of Task Force on National Polar Institute; meeting of National Consortium of Scientific & Educational Societies, meetings of organizing committee, National Student Conference on Northern Studies; Eastern Snow Conference, Hanover, NH (paper); National Forum on a Science and Technology Policy, Winnipeg (paper); Conference of Subarctic Universities (paper, etc.); Ottawa Glaciological Group (several meetings); Advanced Study Institute on Chemistry of Transient Snowpacks, Les Arcs (paper); organizational meeting for IAMAP Conference on Atmospheric Chemistry and Global Pollution (1987); meeting of Board of Churchill Northern Studies Centre; ACUNS Board, Quebec City and Vancouver; official opening of Voices of the Eastern Arctic, DINA; Arctic Circle, Ottawa (several); National Student Conference on Northern Studies, Ottawa; reception and dinner for Northern Science Award; Canadian Northern Studies Trust meetings, Ottawa; Ontario Education Research Council meetings, Toronto; Heritage meeting, Waterloo; meetings of National Atlas Subcommittee, Ottawa; meeting of Canadian Commission for Unesco.

More or less formal meetings with:

Individuals and groups in Whitehorse (e.g. Yukon Conservation Society, Yukon Science Institute), re NPI; Donat Savoie (many), Harold Finkler (several), John Petrolias (several), - all of DINA; R.M. Koerner (PCSP); C.S.L. Ommanney (NHRI); Jocelyn Lillycrop (NSERC); Valeri Nalivalkine (Soviet Embassy, several); Mike Parks (Beaufort Project); Gord Campbell (Norland Scientific, re field stations); Allan Gillmore (AUCC - re Association Membership); Roy Vontobel (Nortext - re Northline, several); R. Riewe (TFN - Manitoba); Doug Parker (Laurentian); Dennis Macknak (Churchill Northern Studies Centre); Arlene Stairs (McGill/Kativik); Tom Smith (Love Printing re Proceedings); Al Sneyd (Canarctic re studentship, several); Catherine Bjerkelund (Norland Scientific); Gordon Nelson (re Trust, etc., several); Peter Johnson (Ottawa re NSC, several); Sheila Woods (CARC); P. de Bastiani (Canarctic re coop. student); Marc-Adélard Tremblay (many); Mike Robinson, AINA; Ross Goodwin, ASTIS; Major Bibeau, CAF, Valcartier; Organizing Committee, NSC (many); Maureen Woodrow, Program Evaluation, DINA; M.-K. Woo, McMaster; Bruce Rigby, Arctic College; John Merritt, CARC; Bob Janes and Jim Harrison, Science Institute, N.W.T.; Jeff Parker, Minister's Office, DINA; Gil Ross, Bishop's University; David Judd, External Affairs (re Scandinavia); P. Burnet and/or Fred Roots, re National Polar Institute (several); G. Jones, Université du Québec à Québec, and students plus Laval students; Keith Greenaway (re Helsinki embassy); Hugh French; the Hon. Bill McKnight; Jacques Gérin, DINA.

Lectures and/or visits

Middlebury College, VT (lecture); Wolcott Center for Northern Studies (lecture); Scott's Plains Kiwanis (lecture); Lakehead University (meetings and lecture); Scott Polar Research Institute (meetings); University of East Anglia (met environmental group); Axel Heiberg Island (fieldwork); McGill (review of Centre for Northern Studies, with M.-A. Tremblay); Boreal Institute (visit and conference); AINA, University of Calgary (lecture and meetings); Simon Fraser University (lecture and meetings); Ryerson (lecture and meetings re annual conference); York (lecture); Learning for Leisure Group, Peterborough (lecture); University of Western Ontario (lecture and tour); Heritage Resources Centre, Waterloo (paper); Queen's University (lecture and meetings); Gloucester High School, Ottawa; University of British Columbia (lecture); University of Victoria (meeting); Université Laval, Division of Hydrology; Institut de Recherches Scientifiques - Eau, Université du Québec; Science Institute of the NWT, Yellowknife (talk).

Presentation:

(with J.G. Nelson) to Assembly of First Nations, Committee on Enquiry on Indian Education, Ottawa

CANADIAN NORTHERN STUDIES TRUST | **FIDUCIAIRE CANADIENNE D'ETUDES NORDIQUES**

REPORT OF THE CANADIAN NORTHERN STUDIES TRUST

1986-87

Members of Council I have great pleasure in making the following report.

Trust Management Committee

I would like to express my gratitude and that of the Association to the following individuals who have served as members of the Management Committee this year: C.D. Hunt, J. Fournier, G. Robertson, J.W.T. Spinks, J.K. Stager, T.H.B. Symons, and M.-A. Tremblay. These people contributed to fundraising and strategic work of the Trust as well as to the adjudication of over 80 applications for awards. We are very fortunate to have their aid and counsel.

Fund Raising

At the time of last reporting to Council, approximately one year ago, we were at the end of the Donner four year matching grant and awaiting word about the Native Economic Development Program and other applications to determine whether we would raise the $250,000 needed to earn the last $125,000 grant from Donner. We were successful and as a result of this effort and a $50,000 MacMillan Northern Canada Trust grant, we now have "endowed funding" for one $10,000 Studentship and one $5,000 Special Award annually for the indefinite future. We also received a donation from the Clifford E. Lee Foundation which enabled us to award an additional Special Award in August 1986. In addition, we received funding for two Studentships from the Royal Canadian Geographical Society. Funds for our other Studentships and two other Special awards were made possible through donations from the following organizations: Canadian National Sportsmen's Shows, BP Canada, Strathcona Mineral Resources, Télésat Canada, The Upjohn Company and a number of private individuals. The Canadian Sportsmen's Shows' donation of $5,000 was specifically given for a Special Award for a Northern Resident.

Fund raising continues to be a major effort for the Chairman and the Association office. We were unsuccessful in seeking two major grants from the Rockefeller Foundation and the Donner Canadian Foundation in 1986/87. We are currently attempting to secure funds for a children's health studies award. We are also working on co-operative possibilities with the Northwest Territories and the provinces.

1986-87 Awards

This year the Trust awarded four Studentships and one Special Award as follows:

Studentships

Erik W. Blake, University of British Columbia
Jacques Grondin, Université Laval
Douglas Nakashima, McGill University
Margaret Scopick, Carleton University

Special Award
Georgina Blondin, University of British Columbia

We are still working on the possibility of another Studentship and two Special Awards.

The quality of the applications continues to be very high with those from M.A. and Ph.D. students constituting a large proportion of the total applications. As a result of this and the quality of the graduate applicants, it seems to be increasingly difficult for undergraduate applications to succeed. The Management Committee is consequently considering specifying a proportion and number of Bachelor's, Master's and Ph.D. awards respectively. Council members may have views on this and other matters for the Committee. As a final point, the CNST awards continue to build bridges between the universities and northern problems and needs and deserve every support for this reason alone.

Conclusion

I wish to offer special thanks to John Stager, who will report on the work of the Native Economic Development Scholarships separately as well as to Gordon Robertson who has been enthusiastic in assisting with fund raising and other matters. I would also like to acknowledge the hard work and strong support of Eileen van Heyst and Peter Adams, who is Executive Officer of the Trust. We all owe them many thanks for an excellent year in the development of the Canadian Northern Studies Trust.

Gordon Nelson
April 14, 1987

RAPPORT DE LA FIDUCIAIRE CANADIENNE D'ÉTUDES NORDIQUES
pour l'exercice 1986-1987

Mesdames et messieurs les membres du Conseil, j'ai l'honneur de vous présenter le rapport qui suit.

Comité de gestion de la Fiduciaire

Je remercie personnellement les personnes suivantes qui, cette année, ont participé aux travaux du Comité de gestion et je leur transmets les remerciements de l'Association: Mme C.D. Hunt, MM. J. Fournier, G. Robertson, J.W.T. Spinks, J.K. Stager, T.H.B. Symons et M.-A. Tremblay. Ces personnes ont contribué aux efforts de recueil de fonds, à l'élaboration de la stratégie de la Fiduciaire et aux décisions sur plus de 80 demandes de bourses. Leur aide et leurs conseils ont été très utiles à la Fiduciaire.

Recueil de fonds

Lors du dernier rapport, présenté au Conseil l'an dernier, le plan quadriennal de confinancement des bourses par la Fondation Donner touchait à sa fin, et nous attendions la réponse des responsables du Programme de

développement économique autochtone et les suites données à d'autres demandes pour savoir si nous pourrions recueillir les 250 000 $ nécessaires à l'obtention du dernier versement de 125 000 $ de la Fondation Donner. Nos efforts ont été couronnés de succès et nous ont permis, avec l'aide d'une subvention de 50 000 $ du MacMillan Northern Canada Trust, de doter, pour une période illimitée, une Bourse d'études de 10 000 $ et une Bourse spéciale de 5 000 $ chaque année. La Fiduciaire a également reçu une donation de la Fondation Clifford E Lee, qui nous a permis d'allouer une Bourse spéciale supplémentaire en août 1986. En outre, la Fiduciaire a reçu une subvention de la Société Royale de géographie du Canada, en vue de financer deux Bourses d'études. Le financement des autres Bourses d'études et deux Bourses spéciales a été réalisé grâce à des donations provenant des organismes suivants: Canadian Sportsmen's Shows, BP Canada, Strathcona Mineral Resources, Télésat Canada, The Upjohn Company et un certain nombre de particuliers. La donation des Canadian Sportsmen's Shows, soit 5 000 $, était réservée à une Bourse spécial pour Nord-Canadien.

La Président et le Bureau de l'Association continuent à consacrer de grands efforts au recueil de fonds. La Fiduciaire n'a pas obtenu de succès en sollicitant deux donations importantes de la Fondation Rockefeller et de la Fondation canadienne Donner en 1986-87. Nous nous efforçons actuellement de recueillir des fonds pour une Bourse d'études en santé infantile. Nous envisageons également des possibilités de collaboration avec des organismes des Territoires du Nord-Ouest et des provinces.

Bourses allouées en 1986-87

Au cours de l'exercice 1986-87, la Fiduciaire a alloué quatre Bourses d'études et une Bourse spéciale, comme suite:

Bénéficiaires des Bourses d'études
Erik W. Blake, Université de la Colombie-Britannique
Jacques Grondin, Université Laval
Douglas Nakashima, Université McGill
Margaret Scopick, Université Carleton

Bénéficiaire de la Bourse spéciale
Georgina Blondin, Université de la Colombie-Britannique.

Nous étudions la possibilité d'allouer une autre Bourse d'études et deux autres Bourses spéciales.

Le niveau des candidats aux bourses continue d'être très élévé et les étudiants des cycles supérieurs présentent une forte proportion du total des demandes. À la suite de cette prédominance et du niveau des candidats des cycles supérieurs, les demandes provenant des étudiants du 1er cycle rencontrent de plus en plus d'obstacles. En conséquence, le Comité de gestion étudie la possibilité de réserver une proportion et un nombre de bourses déterminés aux demandes des étudiants de 1er, 2e et 3e cycles respectivement. Nous prions les membres du Conseil de faire connaître au Comité l'opinion qu'ils peuvent avoir sur ce sujet et sur d'autres questions. Pour finir, signalons que les bourses de la Fiduciaire constituent des voies d'accès des universités vers les problèmes et besoins des Nord-Canadiens, et méritent tout le soutien possible, ne serait-ce que pour cette seule raison.

Conclusion

Je remercie tout spécialement M. John Stager, qui présentera séparément son rapport sur les Bourses d'études en développement économique autochtone, ainsi que M. Gordon Robertson, qui a contribué avec énergie au recueil de fonds et à d'autres activités. Il me faut également souligner l'infatigable activité et le soutien dynamique de Mme Eileen van Heyst et de M. Peter Adams, Directeur général de la Fiduciaire. L'Association leur est très reconnaissante pour l'excellent progrès de la Fiduciaire canadienne d'Études nordiques cette année.

Gordon Nelson
le 14 avril 1987

REPORT OF THE NATIVE ECONOMIC DEVELOPMENT SCHOLARSHIPS PROGRAM

1986-87

The Scholarship Program in Economic Development for Native Students in Canada (NEDSP) is a satellite program to the Canadian Northern Studies Trust (CNST). The NEDSP began with funds from the Federal Government Native Economic Development Program (NEDP) in the amount of $125,000 for the first year 1985-86 to provide 10 Scholarships of $10,000 apiece plus administrative expenses. This contract was part of the overall CNST fundraising to meet the matching conditions for the last instalment of the Donner Canadian Foundation grant that helped to begin CNST activities. In the spring of 1986, ACUNS on behalf of CNST applied again to have this program repeated, and the Federal NEDP again contracted to provide $125,000 for a second year of 10 Scholarships.

The Spring Competition for the 1985-86 program was completed after the 1985-86 Report to ACUNS given in April 1986. The Committee met June 3, 1986 and awarded Scholarships to:

Carol Ann Barnaby for MBA studies at the University of Ottawa
Ricky Fontaine for MBA studies at Université de Sherbrooke
Mary Ann Naokwegijig for MBA studies at Laurentian University
Kelly Ann Speck for Master's in Public Administration at Queen's University

Thus, in all, 10 Scholarships were awarded in the 1985-86 year.

The Awards Committee determined that the 1986-87 competition would be in two parts; the Fall Competition for candidates starting their studies in January 1, May 1 or September 1, 1987 would have a closing deadline of November 1, 1986, and the Spring competition for students entering programs on May 1 or September 1, 1987, a closing deadline of April 1, 1987 was decided. The criteria for last year were used again, namely

The educational program of the successful candidates will have special relevance to economic development for native

peoples in Canada. Preference will be given on the basis of academic excellence, but work-related experience with potential for initiative and leadership qualities will be taken into account. The subject areas that have direct bearing on economic development will be considered, and the applicability of the course of study to native economic development must be demonstrated.

The Committee met on December 8, 1986 to make the Fall awards, and one award to Mlle. Suzette Jeannotte was made to support her MBA studies at Laval University. At that time 9 applications were on hand. Two problems were apparent. First, a number of applicants were indeed progressing toward graduate degrees or diplomas as stipulated in the Program, but several candidates were not really heading toward subjects dealing directly with economic development. It seemed that there was a tendency to regard the program as supporting almost any subject of study that was only remotely concerned with native economics or natives in economic roles. The Committee felt obliged to respect the goals of the NEDP in awarding support for students who were clearly going towards economic development. A second problem occurred in that some applicants were still pretty uncertain about their plans, and had not yet made firm arrangements with a university for admission.

The meeting for the Spring Competition is scheduled for April 30, 1987.

The Committee has taken the view that continuity of the scholarship program over a few years is the best way to gain interest and acceptance for the awards, and indeed it will allow students to plan their studies toward economic development topics so as to be eligible for the scholarships. We are finding, however, that the number of native students applying is not as large as we had hoped. In reporting to Council, I urge members of Council to try and take an active hand at your home university to identify potential candidates. The Committee has engaged in a wide advertising campaign, but it feels that some of the best contacts for encouraging native students to proceed to graduate studies exist on the home campus where the students are completing their first degrees.

Steps have been taken for the program to continue, and in December 1986, a presentation was made to the NEDP which called for a five year period of scholarship awards for which the funding would be committed in advance, acting like a fixed term endowment. Two options were given, one for 5 scholarships per year, and the other for 10 scholarships each year. At the time of writing we have not had a decision from NEDP.

The present Awards Committee is:

John K. Stager, University of British Columbia, Chairman
Marlene Castellano, Trent University
Leroy Littlebear, University of Lethbridge
Blair Stonechild, Saskatchewan Indian Federated College, University of Regina
Marc-Adélard Tremblay, Université Laval, ex-officio
Gail Valaskakis, Concordia University

As Chairman, I wish to express my appreciation to the Committee members for their wise and loyal participation, and to Peter Adams and Eileen van Heyst for their administrative support.

John K. Stager
April 14, 1987

RAPPORT SUR LE PROGRAMME DE BOURSES D'ÉTUDES EN DÉVELOPPEMENT ÉCONOMIQUE AUTOCHTONE

pour l'exercice 1986-1987

Le Programme de Bourses d'études en développement économique pour étudiants autochtones du Canada a été lancé comme programme complémentaire par la Fiduciaire canadienne d'Études nordiques, grâce à un financement de 125 000 $, pour la première année 1985-86, provenant du Programme de développement économique autochtone exploité par l'Administration fédérale; ce financement permettait d'attribuer 10 bourses de 10 000 $ chacune, outre les frais administratifs. Ce contrat s'est inscrit dans le cadre de l'effort général de recueil de fonds entrepris par la Fiduciaire pour remplir les conditions du dernier versement de cofinancement accordé par la Fondation canadienne Donner en vue de démarrage de la Fiduciaire. Au printemps 1986, l'AUCEN sollicita, au nom de la Fiduciaire, une reconduction de ce contrat, ce qui lui fut accordé par les responsables du Programme fédéral, et lui permit de consacrer encore 125 000 $ au financement de 10 Bourses d'études en développement économique autochtone.

Le concours de printemps du programme d'attribution de bourses 1985-86 s'acheva après la présentation à l'AUCEN du Rapport pour 1985-86, en avril 1986. Le Comité d'attribution des bourses se réunit le 3 juin 1986, et accorda des bourses aux étudiants suivants:

Carol Ann Barnaby, pour des études de 2e cycle en gestion d'entreprise, à l'Université d'Ottawa
Ricky Fontaine, pour des études de 2e cycle en gestion d'entreprise, à l'Université de Sherbrooke
Mary Ann Naokwegijig pour des études de 2e cycle en gestion d'entreprise, à l'Université Laurentienne
Kelly Ann Speck, pour des études de 2e cycle en administration publique, à l'Université Queen's.

Ainsi donc, 10 de ces bourses furent allouées au cours de l'exercice de 1985-86.

Le Comité d'attribution des bourses décida de diviser le concours de 1986-87 en deux phases: le concours d'automne, dont la date-limite d'inscription serait le 1er novembre 1986, était destiné aux candidats commençant leurs études de 2e cycle le 1er janvier, le 1er mai ou le 1er septembre 1987; le concours de printemps, dont la date-limite d'inscription

serait le 1er avril 1987, était destiné aux étudiants entreprenant leurs programmes d'études le 1er mai ou le 1er septembre 1987. Les critères d'inscription étaient les mêmes que l'année précédante, comme suit:

> Le programme d'études des candidats choisis devra avoir un intérêt particulier pour le développement économique des peuples autochtones du Canada. On accordera la préférence aux candidats dont le dossier universitaire est excellent, mais on tiendra aussi compte de l'expérience acquise au travail ainsi que des qualités d'initiative et de commandement du candidat. Les études devront être menées dans des domaines ayant des rapports directs avec le développement économique, et le candidat devra montrer que son programme d'études répond aux besoins du développement économique autochtone.

Le Comité s'est réuni le 8 décembre 1986 pour attribuer les bourses du concours d'automne, et une bourse a été accordée à Mlle Suzette Jeannotte pour financer ses études de 2e cycle en gestion d'entreprise à l'Université Laval. À ce moment-là, le Comité avait reçu 9 demandes de bourse, mais deux problèmes étaient apparus: en premier lieu, un certain nombre de candidats étudiaient bien en vue d'un diplôme de cycle supérieur comme le programme l'exigeait, mais parfois dans des domaines n'intéressant pas directement le développement économique. L'opinion générale semblait être que le Programme financerait des études dans presque tous les domaines n'ayant même qu'un rapport lointain avec l'économie autochtone, ou avec les autochtones assumant un rôle économique. Le Comité s'estimait lié par les objectifs du Programme de développement économique autochtone, et n'attribuait des bourses qu'aux candidats dont le programme d'études était clairement orienté vers le développement économique. En second lieu, les plans de certains candidats étaient encore fort incertains, et ils n'avaient pas encore pris de fermes dispositions pour leur inscription à l'université.

La réunion du Comité concernant le concours de printemps doit se dérouler le 30 avril 1987.

Le Comité considère qu'il est très important d'assurer la continuité du Programme au cours de plusieurs années, afin d'éveiller l'intérêt des étudiants et de bien établir les bourses; elle permettrait aux étudiants d'élaborer leurs plans d'études en développement économique en vue d'être admissibles aux bourses correspondantes. Cependant, nous avons constaté que le nombre d'étudiants autochtones présentant des demandes n'était pas aussi grand que nous avions espéré. C'est pourquoi je demande aux membres du Conseil de chercher à mettre en évidence des candidats éventuels dans leur propre université. Le Comité a mis en oeuvre une vaste campagne de publicité, mais il estime que c'est dans le cadre de l'université où l'étudiant autochtone achève ses études de 1er cycle qu'il est possible d'avoir des contacts directs permettant de l'encourager à entreprendre des études de 2e cycle.

Nous avons fait des démarches pour assurer la continuité du Programme et, en décembre 1986, nous avons présenté aux responsables du Programme de développement économique autochtone une proposition de mise sur pied d'un Programme quinquennal de bourses dont le financement serait réservé d'avance,

tout comme s'il s'agissait d'une dotation pour une période déterminée. Nous avons suggéré deux options, l'une prévoyant l'attribution de cinq bourses par an, et l'autre de dix bourses. Au moment de la rédaction du présent Rapport, les responsables du Programme de développement économique autochtone ne nous ont pas encore fait connaître leur décision.

Le Comité d'attribution des bourses comprend les members suivants:

M. John K. Stager, Université de la Colombie-Britannique, président
Mme Marlene Castellano, Université Trent
M. Leroy Littlebear, Université de Lethbridge
M. Blair Stonechild, Collège indien fédéré de la Saskatchewan, Université de Régina
M. Marc-Adélard Tremblay, Université Laval, ès qualités
Mme Gail Valaskakis, Université Concordia

En tant que président du Comité, je désire souligner la coopération loyale et avisée de ses membres, et remercie M. Peter Adams et Mme Eileen van Heyst pour un soutien administratif sans défaillance.

John K. Stager
le 14 avril 1987

ASSOCIATION OF CANADIAN
UNIVERSITIES FOR NORTHERN STUDIES

ASSOCIATION UNIVERSITAIRE
CANADIENNE D'ETUDES NORDIQUES

OFFICERS

President
M.-A. Tremblay
Vice-President
H.M. French
Secretary-Treasurer
F. Duerden

EXECUTIVE DIRECTOR
J.P. Adams

March 26, 1987

REPORT OF THE NOMINATING COMMITTEE

Chairman: J. Dufour, Université du Québec à Chicoutimi
J.B. Carefoot, University of Regina
R.F. Keith, University of Waterloo

The following names are submitted for election to the Board of Directors at the Annual General Meeting in Toronto, May 2, 1987.

Officers

President:	Marc-Adélard Tremblay, Université Laval
Vice-President:	John K. Stager, University of British Columbia
Secretary-Treasurer:	Frank Duerden, Ryerson Polytechnical Institute
Members	James B. Carefoot, University of Regina
	Hugh M. French, University of Ottawa
	Marianne Stenbaek, McGill University
	Geoffrey R. Weller, Lakehead University

All have been contacted and all have agreed to let their names stand.

By-Law 22 (attached) provides for additional nominations. These should be sent to the Secretary-Treasurer at the Association office by April 17, 1987. Nominations so received will be placed on the ballot along with those provided by the Nominating Committee.

Please note also that By-Laws require that ".... both official languages shall be represented in the Officers of the Association by the first language of the individual in office" (By-Law 35).

Jules Dufour
Chairman, Nominating Committee

ASSOCIATION OF CANADIAN
UNIVERSITIES FOR NORTHERN STUDIES

ASSOCIATION DES UNIVERSITÉS
CANADIENNE D'ETUDES NORDIQUES

OFFICERS
President
M.-A. Tremblay
Vice-President
H.M. French
Secretary-Treasurer
F. Duerden

EXECUTIVE DIRECTOR
J.P. Asselin

le 26 mars 1987

RAPPORT DU COMITÉ DES MISES EN CANDIDATURE

Président: J. Dufour, Université du Québec à Chicoutimi
J.B. Carefoot, University of Regina
R.F. Keith, University of Waterloo

Les candidats dont les noms suivent sont proposés au Conseil d'administration en vue de leur élection lors de l'Assemblée générale annuelle à Toronto, le 2 mai 1987.

Officiers

Président:	Marc-Adélard Tremblay, Université Laval
Vice-président:	John K. Stager, University of British Columbia
Secrétaire-trésorier:	Frank Duerden, Ryerson Polytechnical Institute
Administrateurs	James B. Carefoot, University of Regina
	Hugh M. French, Université d'Ottawa
	Marianne Stenbaek, McGill University
	Geoffrey R. Weller, Lakehead University

Ils ont tout été contactés et se sont tous déclarés d'accord pour que leurs noms demeurent sur la liste.

Règlement 22 (ci-joint) dit que des nominations supplémentaires pourront être effectuées. Ces candidatures devront être envoyées au plus tard le 17 avril 1987 au secrétaire-trésorier, au siège de l'Association. Elles seront, en pareil cas, jointes au bulletin de vote à celles que présentera le Comité des mises en candidatures.

Veuillez bien noter en outre que les règlements exigent ce qui suit: "..... les deux langues officielles devront être représentées chez les Officiers de l'Association, par leur langue maternelle" (règlement n° 35).

Jules Dufour
Président
Comité des mises en candidature

BY-LAW 22 - PROCEDURE FOR ELECTION AT MEETINGS OF COUNCIL

".... The Nominating Committee shall propose names for all elected posts of the Board of Directors and election of Officers. All nominees must be eligible and willing to serve. Additional nominations signed by three delegates may be submitted to the Secretary-Treasurer within fifteen days prior to the meeting.

All other elections that become necessary in the carrying out of the business of the Association shall follow procedures determined by the members present in general meeting.

Faculty or administrators of member institutions are eligible to stand for office as directors or officers provided that at least one-half of the directors and officers elected are members of Council.

In order to achieve this objective the elections of directors and officers shall proceed in the following order:

(a) The election of the President
(b) The election of the Vice-President
(c) The election of the Secretary-Treasurer
(d) The election of the Directors"

RÈGLEMENT Nº 22 - PROCÉDURE POUR LES ÉLECTIONS AU RÉUNIONS DU CONSEIL

".... Le comité de nomination proposera des noms pour tous les postes à pourvoir, par élection, au conseil d'administration et à la direction. Les personnes nommées devront être éligibles et avoir accepté de servir. Au moins quinze jours avant l'assemblée, des nominations supplémentaires pourront être effectuées et soumises au secrétaire-trésorier sous la signature de trois délégués.

Toutes les élections qui seront nécessaires pour la bonne marche des affaires de l'Association seront effectuées selon les procédures déterminées par les membres présents à l'assemblée générale.

La Faculté ou les administrateurs des institutions membres sont éligibles comme candidats aux postes de directeurs ou officiers, à condition qu'au moins la moitié des directeurs et officiers soient membres du Conseil.

Afin de réaliser cet objectif, les élections des directeurs et officiers seront effectuées dans l'ordre suivant:

(a) Élection du Président
(b) Élection du Vice-Président
(c) Élection du Secrétaire-Trésorier
(d) Élection des Directeurs"

APPENDIX A

ASSOCIATION OF CANADIAN
UNIVERSITIES FOR NORTHERN STUDIES

ASSOCIATION UNIVERSITAIRE
CANADIENNE D'ETUDES NORDIQUES

OFFICERS
President
M.-A. Tremblay
Vice-President
J.K. Stager
Secretary-Treasurer
F. Duerden

EXECUTIVE DIRECTOR
G.R. Brassard

TENTH ANNIVERSARY CONFERENCE

in conjunction with a Northern and Offshore Information Resources Seminar

Ryerson Polytechnical Institute, Toronto*

APRIL 30, 1987 - MAY 2, 1987

PROGRAM

WEDNESDAY, APRIL 29

1300-1700 Arctic Heritage Symposium Follow-up - Room A 1402, Jorgenson Hall

A session on the recently published Arctic Heritage findings and recommendations and what has been and should be done about them and by whom. Interested parties include government, native groups, university and other persons. ACUNS Council Members are welcome. They should contact J.G. Nelson at the Faculty of Environmental Studies, University of Waterloo, Waterloo, Ont. N2L 3G1 (519) 888-4555 or the ACUNS office.

THURSDAY, APRIL 30

Room H 202

Northern and Offshore Information Resources
Sponsored by the Arctic Institute of North America, the Centre for Frontier Engineering Research and ACUNS.

A one-day seminar designed to bring information professionals and end-users together to learn about available resources and methods of retrieval of information on northern and offshore regions. Additional information is enclosed. ACUNS members and others should contact the NOIR agencies using the form provided.

AGENDA

0830-0900	Registration and coffee
0900-1200	Presentations
1200-1330	Lunch and Guest Speaker
1330-1500	Presentations
1500-1615	Discussion Period
1615-1700	Selected On-Line Demonstrations

Room A, Oakham House

Meeting of Subarctic Universities

1400-1600 Lakehead University
Laurentian University
Memorial University
Université du Québec en Abitibi-Témiscamingue
Université du Québec à Chicoutimi

Those interested should contact G.R. Weller, Vice-President, Academic, Lakehead University, Thunder Bay, Ont. P7B 5E1, (807) 345-2121.

1400-1600 Awards Committee, Native Economic Development Scholarships, Bond Place Hotel.

1600-1800 ACUNS Board meeting, Bond Place Hotel (to be continued during dinner)

2000-2200 ACUNS Conference Registration. Cash bar. London Hall, Bond Place Hotel.
(Registration fee: $35.00, Students $10.00)

* All sessions in the Architecture Building, Ryerson, 325 Church Street, Toronto, except where indicated. This building is easy walking distance from the Bond Place Hotel.

FRIDAY, MAY 1 ROOM H 202

TECHNOLOGY AND THE NORTH*

Chair, Morning Session - Marc-Adélard Tremblay, President, ACUNS

0830	Welcoming Address Dr. Brian Segal, President, Ryerson Polytechnical Institute	
0845	Session 1	
	Keynote Address	Bob Page, Trent University
	Planning Northern Communities in the Future	Norman Pressman, University of Waterloo
	Technology and Community Design	Xenia Zepic, City of Toronto, Livable Winter City Assoc.
1030	Coffee	
1045	Session 2	
	Communications Technology & Northern Peoples	Marianne Stenbaek, McGill University
	Communications Technology & the North	Michael Bravo, Scott Polar Research Institute
	Inuit Clothing Technology	Jill Oakes, University of Manitoba
1215-1345	Lunch, hosted by Ministry of Northern Development & Mines, Government of Ontario Speaker: Herb Aiken, Assistant Deputy Minister Ministry of Northern Development & Mines	Oakham House, Ryerson

Chair, Afternoon Session - Geoffrey Weller, Lakehead University

1345	Session 3	
	Science, Technology and Arctic Sovereignty	Keith R. Greenaway former Science Advisor, Indian & Northern Affairs Ed Dosman, Politics, York University
1500	Coffee	
1515-1700	Session 4	
	Wildlife Mapping. Does It Work and Is It Worth It?	Paul Gray Habitat Management, GNWT
	Mapping the Nunavut Land Claim	Rick Riewe Tungavik Federation of Nunavut
	Geographic Information Systems and Their Application to the Yukon Land Claim	D. Banting & F. Duerden, Ryerson
1830	Reception, hosted by Ryerson Polytechnical Institute. Inuit Fashion Show, Inuit Cultural Institute - Sally Karetak & Jill Oakes	Oakham House, Ryerson
2000	Tenth Anniversary Banquet Guest speaker: Professor T.H.B. Symons, Trent University, delivers the speech of Hon. Bill McKnight, Minister of Indian Affairs and Northern Development	Oakham House, Ryerson

* Northern Films - throughout the day, a series of films on the Canadian North-Room H108

SATURDAY, MAY 2 ROOM H 202

POLAR SCIENCE AND CANADA

Chair - John K. Stager, University of British Columbia

0900-0930 Dr. A. Lincoln Washburn
Professor Emeritus, Quaternary Research Center, Department of Geological Sciences, University of Washington, Seattle

"The Arctic Research and Policy Act of the U.S. Congress and Its Implications for U.S. Arctic Research"

0930-1000 Dr. E.F. Roots
Science Advisor, Environment Canada

"Polar Science and Canada with Special Reference to the Recent Enquiry into a Polar Institute for Canada"

1000-1015 Coffee

1015-1115 Panel Discussion - Question and Answer

Panel:
A.L. Washburn
E.F. Roots*
R.R. Janes, Science Institute of the N.W.T.
M.R. Gordon*
P.F. Burnet*
W.P. Adams*

*Members of the 'Polar Institute' task force, Fred Roots, Chair

1115-1215 Special Tenth Anniversary Address

Dr. Trevor Lloyd, Founder of ACUNS

1215-1400 Sandwich lunch for ACUNS Council and question and answer session with Northern Scientific Training Program Committee - Foyer

1400-1700 Room H 202 - ACUNS Annual General Meeting

ACUNS Council and Board only

1730 Meeting of newly elected Board of Directors

ASSOCIATION OF CANADIAN
UNIVERSITIES FOR NORTHERN STUDIES

ASSOCIATION UNIVERSITAIRE
CANADIENNE D'ETUDES NORDIQUES

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CONFÉRENCE DU DIXIÈME ANNIVERSAIRE

réunie en même temps qu'un Colloque sur les ressources documentaires concernant le Nord et les régions marines

Ryerson Polytechnical Institute, Toronto*
DU 30 AVRIL AU 2 MAI 1987

PROGRAMME

MERCREDI, AVRIL 29

13h à 17h Atelier sur le patrimoine de l'Arctique - Salle A 1402, Jorgenson Hall

Cet atelier donnera suite au Colloque de 1985 sur le patrimoine de l'Arctique, dont le Compte rendu vient juste d'être publié par l'AUCEN. Les intéressés devront prendre contact avec J.G. Nelson, Faculty of Environmental Studies, University of Waterloo, Waterloo, Ont. N2L 3G1 (519) 888-4555.

JEUDI, AVRIL 30

Salle H 202

Ressources documentaires, Nord et mer sous les auspices de l'Arctic Institute of North America, le Centre for Frontier Engineering Research et l'AUCEN.

Journée d'études réunissant spécialistes de la documentation et utilisateurs désireux de se renseigner au sujet des ressources disponibles et des méthodes de recherche de l'information sur le Nord et la mer. Renseign. addit. ci-incl. Les membres de l'AUCEN et autres devront utiliser la formule fournie pour prendre contact avec les organismes du NOIR.

PROGRAMME

8h30-9h	Enregistrement et pause-café
9h-12h	Exposés
12h-13h30	Repas, conférencier invité
13h30-15h	Exposés
15h-16h15	Débat
16h15-17h	Démonstrations

Salle A, Oakham House

Réunion des universités subarctiques

14h-16h Lakehead University
Université Laurentianne
Memorial University
Université du Québec en Abitibi-Témiscamingue
Université du Québec à Chicoutimi

Les intéressés devront prendre contact avec G.R. Weller, Vice-President, Academic, Lakehead University, Thunder Bay, Ont. P7B 5E1 (807) 345-2121

14h-16h Comité des bourses, Bourses d'études en développement économique autochtone. Bond Place Hotel

16h-18h Conseil d'administration de l'AUCEN, Bond Place Hotel, (sera poursuivie au cours du dîner)

20h-22h Enregistrement à la Conférence de l'AUCEN. Bar payant. London Hall, Bond Place Hotel
(Droit d'inscription: 35 $; Étudiants 10 $)

* Toutes les séances se dérouleront à l'Architecture Building, Ryerson, 325 Church Street, Toronto, sauf en cas d'indication contraire. Ce bâtiment est à courte distance pédestre de l'Hôtel Bond Place.

VENDREDI, 1er MAI — SALLE H 202

LA TECHNOLOGIE ET LE NORD*

Présidence des séances du matin - Marc-Adélard Tremblay, Président, l'AUCEN

8h30	Allocution d'ouverture M. Brian Segal, Président, Ryerson Polytechnical Institute	
8h45	1ere séance	
	Exposé introductif	Bob Page, Trent University
	L'aménagement des agglomérations nordiques de l'avenir	Norman Pressman, University of Waterloo
	Technologie et composition urbaine	Xenia Zepic, City of Toronto Livable Winter City Assoc.
10h30	Pause-café	
10h45	2e séance	
	Technologie des télécommunications et peuples nordiques	Marianne Stenbaek, McGill University
	Technologie des télécommunications et le Nord	Michael Bravo, Scott Polar Research Institute
	Technologie du vêtement inuit	Jill Oakes, University of Manitoba
12h15-13h45	Repas offert par le Ministère du Développement du Nord et des Mines, Gouvernement de l'Ontario Allocution: M. Herb Aiken, Sous-ministre adjoint, Développement du Nord et des Mines	Oakham House, Ryerson

Présidence des séances de l'après-midi - Geoffrey Weller, Lakehead University

13h45	3e séance	
	Science, Technologie et Souveraineté sur l'Arctique	Keith R. Greenaway antiéurement conseiller scientifique, MAINC Ed Dosman, Politics, York University
15h	Pause-café	
15h15-17h	4e séance	
	Cartographie faunique: est-elle fonctionnelle et utile?	Paul Gray Gestion des habitats,T.N.-O.
	Cartographie des revendications territoriales nunavutes	Rick Riewe Tungavik Federation of Nunavut
	Les réseux documentaires géographiques et leur utilisation en matière de revendications territoriales yukonaises	D. Banting & F. Duerden, Ryerson
18h30	Réception, offerte par Ryerson Polytechnical Institute. Défilé de mode inuit, Institut culturel inuit - Sally Karetak & Jill Oakes	Oakham House, Ryerson

20h — Banquet du Dixième anniversaire — Oakham House, Ryerson
Conférencier invité: le Professeur T.H.B. Symons, l'Université Trent, présente remarques de l'honorable Bill McKnight, Ministre des Affaires indiennes et du Nord

* Films sur le Nord: Au cours de la journée, on projettera une série de films sur le Nord canadien dans la salle H 108.

SAMEDI 2 MAI — SALLE H 202

LES SCIENCES POLAIRES ET LE CANADA

Présidence de la séance - John K. Stager, University of British Columbia

9h-9h30 — M. A. Lincoln Washburn
Professeur émérite, Quaternary Research Center, Department of Geological Sciences, University of Washington, Seattle

"La Loi américaine sur la recherche et la politique arctiques, et ses effets sur la recherche concernant l'Arctique"

9h30-10h — M. E.F. Roots
Conseiller scientifique, Environnement Canada

"Les sciences polaires et le Canada, dans l'optique particulière de l'Enquête récente sur la création d'un Institut polaire canadien"

10h-10h15 — Pause-café

10h15-11h15 — Groupe de discussion - Questions et réponses

Membres:
A.L. Washburn
E.F. Roots*
R.R. Janes, Institut des sciences des T.N.-O.
M.R. Gordon*
P.F. Burnet*
W.P. Adams*

*Membres du group de travail sur l'Institut polaire, sous la direction de M. Fred Roots

11h15-12h15 — Allocution spéciale du Dixième anniversaire

M. Trevor Lloyd, fondateur de l'AUCEN

12h15-14h — Collation pour le Conseil de l'AUCEN, et séance de questions et réponses animée par le Comité du Programme de formation scientifique dans le Nord
Foyer

14h-17h — Salle H 202 - Assemblée générale annuelle de l'AUCEN

Réservée au Conseil de l'Association et à son conseil d'administration

17h30 — Réunion du nouveau Conseil d'administration, AUCEN

PARTICIPANTS - ACUNS ANNUAL CONFERENCE, 1987

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* in the following list indicates those who attended the ACUNS meetings as well as the NOIR Seminar.

NORTHERN AND OFFSHORE INFORMATION RESOURCES

Thursday, 30 April 1987, Ryerson Polytechnical Institute, Toronto, Ontario

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Association of Canadian Universities for Northern Studies
Association universitaire canadienne d'Études nordiques

Publications

The Use of Greenlandic and Danish in Greenland Schools. 1980.

Some Thoughts on the Current State of Teaching and Research about Northern Canada. T.H.B. Symons, April 1980.

Proceedings of the First International Symposium on Renewable Resources and the Economy of the North. M.M.R. Freeman (ed.), 1981.

Ethical Principles for the Conduct of Research in the North/Principes d'éthique pour la conduite de la recherche dans le Nord. 1982 (also available in Inuktitut).

Resources and Dynamics of the Boreal Zone: Proceedings of a Conference held at Thunder Bay, Ontario, August 23-26, 1982. R.W. Wein, R.R. Riewe and I.R. Methven (eds.), 1983.

List of Northern Specialists at Canadian Universities/Liste des spécialistes du Nord dans les universités canadiennes. 1983.

Social Science in the North: Communicating Northern Values. 1984.

Federal government Resources for University Research and Science Training in the North/Ressources du gouvernement fédéral pour la recherche et la formation scientifique dans le Nord. 1984.

Guide to Northern Science Licences and Permits/Recherche Nordique — Répertoire des licences et permis. 1984.

Distance Education in the Canadian North: An Annotated Bibliography. 1984.

Canada's Northern Stations. G.T.J. Campbell and W.P. Adams (eds.), 1986.

Artic Heritage. Proceedings of a Symposium. J.G. Nelson, Roger Needham and Linda Norton (eds.), 1987.

Education, Research, Information Systems and the North. W.P. Adams (ed.), 1987.

Canada's Subarctic Universities/Les universités canadiennes du Moyen-Nord. W.P. Adams and D. Parker (eds.), 1987.

Student Research in Canada's North/Les recherches des étudiants dans le Nord canadien. W.P. Adams and P.G. Johnson (eds.), 1988.

The ACUNS newsletter *Northline* appears four times a year, and is available free on request./ Le bulletin de L'AUCEN *Point Nord* paraît quatre fois au cours de l'année. On peut l'obtenir gratuitement sur demande.

Association of Canadian Universities for Northern Studies
Association universitaire canadienne d'Études nordiques

The Association represents thirty-four Canadian universities active in northern studies, research and training. Founded at Churchill, Manitoba in 1977, it is a federally incorporated charitable organization.

The purpose of the Association is the advancement of northern scholarship through education, professional and scientific training and research.

L'Association représente trente-quatre universités canadiennes actives dans le domaine des études, de la recherche et de la formation sur le Nord. Fondée à Churchill, Manitoba en 1977, c'est une organisation charitable, à but non lucratif et incorporée.

L'objectif de l'Association est l'avancement de l'érudition nordique, grâce à l'éducation, la formation professionnelle et scientifique, et la recherche.

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